Request for Removal from Greenbelt Plan Boundary

Prepared for:

~SUNVALLEY ESTATES LIMITED~
Lot 17, Concession 1 EHS Caledon Village
Town of Caledon

HUMPHRIES PLANNING GROUP INC.
190 Pippin Road, Suite A
Vaughan, Ontario L4K 4X9

December, 2022

1.0 INTRODUCTION

This Planning Review is prepared on behalf of Sunvalley Estates Limited, in support of a proposal to develop a predominantly senior's development with an institutional component and a mix of uses which is intended to service the local/surrounding Village area as well as to support aging in place. It is expected that at full build-out, the facility is proposed to consist of approximately 1,400 units, providing care, accommodation, and support for approximately 2,100 individuals targeted at minimum age of 55.

The subject lands are located north of Caledon Village, on Lot 17, Concession 1 EHS, immediately abutting the northwestern edge of Caledon Village. The lands are a through lot with an approximate area of 80 hectares, having frontage on both Hurontario Street and Kennedy Road.

While couples and families with children make up the largest proportion of households in the Town Caledon and the broader Region, there is also a need for housing options that are suitable for seniors, and persons with disabilities and this need will continue to increase in the next five and ten years. The existing housing supply does not fully meet the current and emerging housing need as it is still very focused on single detached homes. There is a need for more diverse housing options, including accessible housing options, more modest options for households with low and moderate incomes and seniors wanting to downsize, and supportive housing options for persons with special needs.

It is further recognized that based on review of available census data between the years 2001 to 2011 population growth for Caledon Village is growing at a very slow rate. Specifically, the population of Caledon Village increased by only 1.6% during this period while the population of the more rural areas of the Town increased by 1.9%. Further, Caledon Village is largely built-out with little to no vacant land available to accommodate future planned growth and intensification potential constrained due to the lack of growth-related infrastructure (i.e., municipal water and wastewater services). It is also recognized that older adults now represent the fastest growing segment of the population, and over the next decade, the number of residents in Caledon age 55 and over is expected to increase by over 10,000 persons. Taken together, there is a need to plan and accommodate for additional housing options, facilities and infrastructure that are appropriately aligned to support the needs of an ageing population.

The subject lands represent a continuous and logical progression of the Caledon Village Community while contributing to the overall variety of seniors related dwelling types and facilities available to the current and future residents of the Town. The proposal directly assists the Town in achieving a complete community with appropriate densities and mixes of uses that reflects current policy and plans from the Province. It is also the applicants desire to develop this project with an integrated vision and strategy through the provision of critical public services to facilitate development while also supporting future potential growth in the Village. Final determination of specific components will be undertaken as part of the detail design process when decisions regarding details of the project are made.

This review concludes that the proposed development is consistent with the policy framework expressed in the 2020 Provincial Policy Statement ("PPS"), the 2020 Growth Plan for the Greater Golden Horseshoe ("Growth Plan"), the 2017 Greenbelt Plan, the 2022 Region of Peel Official Plan and the Town of Caledon Official Plan, all of which support the provision of a wide range of housing options including affordable housing to meet the social, health and well-being requirements of residents, including special institutional needs housing.

2.0 SITE AND SURROUNDINGS

2.1 Subject Property and Development Site

The subject property is located immediately northwest of Caledon Village on the east side of Hurontario Street, north of Charleston Sideroad, with access to both Hurontario Street and Kennedy Road. The subject property is approximately 80 hectares (198 acres), the majority of which represent table land portions of lands within the Protected Countryside designation of the Provincial Greenbelt utilizing for previous agricultural and farming related uses. The site is effectively bifurcated (from east to west) with a central forested area which surrounds a branch of the Credit River.

FIGURE 1 – AIR PHOTO OF SUBJECT PROPERTY

3.0 PROPOSAL

3.1 Proposed Senior's Institutional Facility Development Plan

The proposed development contemplates a predominantly senior's development with an institutional component and a mix of uses which is intended to service the local/surrounding Village area as well as to support aging in place. It is expected that at full build-out, the facility is proposed to consist of approximately 1,400 units, providing care, accommodation, and support for approximately 2,100 individuals targeted at minimum age of 55. The institutional component is planned to offer a range of accommodation options (i.e., senior's apartments, independent supportive living, assisted living etc.) designed to provide a variety of choices and services to clients, enabling both long- and short-term care under the backdrop of a rural setting. A variety of locally oriented and complimentary convenience, retail and service commercial uses are also planned to support the vitality and viability of the development and the Caledon Village as well as to establish a complete community that feature a diverse mix of compatible land uses.

FIGURE 2 – CONCEPTUAL DEVELOPMENT PROPOSAL

The central wooded area is proposed to be protected through suitable zoning and will form the basis for a recreational trail system offering walking paths and quiet seating locations to provide residents with active and passive recreational opportunities and pursuits.

3.2 Required Approvals

It is anticipated that with the removal of the property from the Greenbelt Plan Boundary, the necessary amendments to the Regional and local municipal documents will follow including a private application for a boundary expansion to the Settlement of Caledon Village as permitted

by Section 2.2.9 of the Growth Plan. In addition, site specific amendments to the zoning by-law will be required to facilitate the proposed development. An Environmental Impact Study will be undertaken by the owner and the central natural heritage feature will be appropriately zoned for its long-term protection. It is anticipated the zoning by-law would zone the balance of the parcel for proposed uses and identify those portions of the site which are to be utilized for each development form. The amending by-law will also outline appropriate site-specific use and development standards. The owner will seek a future site plan approval from the Town of Caledon to enable the development of the subject lands in accordance with the proposal outlined above.

It is recognized that while the establishment of private services are possible, the provision of municipal infrastructure is more efficient and sustainable in the long term. In collaboration with the Region of Peel and the Town of Caledon, services are proposed to be extended for the development and to Caledon Village. In doing so, the Caledon Village will benefit from additional capacity to support development, redevelopment, and infill opportunities. Planning for sewage and water services is particularly important to ensure that communities, like the proposed, have a potable water supply and proper collection, treatment and disposal of sewage wastewater that protects the natural environment and public health.

4.0 POLICY AND REGULATORY CONTEXT

4.1 Provincial Policy Statement ("PPS")

The *Provincial Policy Statement* provides policy direction on matters of provincial interest related to land use planning and development. Efficient land use and development patterns support strong, liveable and healthy communities, protect the environment and public health and safety and facilitate economic growth.

Section 1.1.1 of the PPS provides guidance to support the creation of healthy, liveable and safe communities. Among other matters, the PPS supports "*an appropriate affordable and market based range and mix of residential types (including single detached, additional residential units, multi unit housing, affordable housing and housing for older persons).* It also aims at *"improving accessibility for persons with disabilities and older persons by addressing land use barriers which restrict their full participation in society".* Lastly, the PPS requires that "*sufficient land be made available to accommodate an appropriate range and mix of land uses to meet projected needs for a time horizon of up to 25 years*".

The proposed development supports the policies of the PPS by ensuring that appropriate and affordable housing and institutional care is made available to existing senior populations who wish to age in place. The development will also establish a comprehensive mix of uses, including a range of employment, institutional, and broader mixed uses to meet long-term needs and encourages compact, mixed-use development that supports liveable, resilient and complete communities. While the subject lands are located outside of an identified settlement area, the site is located on the outer edge of the Caledon Village which represents as logical and contiguous pattern of development and expansion of the urban boundary. The site is of sufficient size, location and configuration to support expansion and an integration of land uses

while avoiding key natural heritage systems and features. The proposed development meets the requirements of the Provincial Policy Statement.

4.2 Greenbelt Plan, 2017

The 2017 Greenbelt Plan contains a series of policies which identify where urbanization should and should not occur in order to protect the agricultural land base and the ecological features and functions of the landscape. The policies are arranged in several categories, including agricultural and natural systems, settlement areas, countryside areas and lands which form part of the Oak Ridges Moraine and the Niagara Escarpment.

The subject lands are identified as forming part of the Protected Countryside. The lands have also been identified by the Greenbelt Plan as containing portions of the Natural Heritage System.

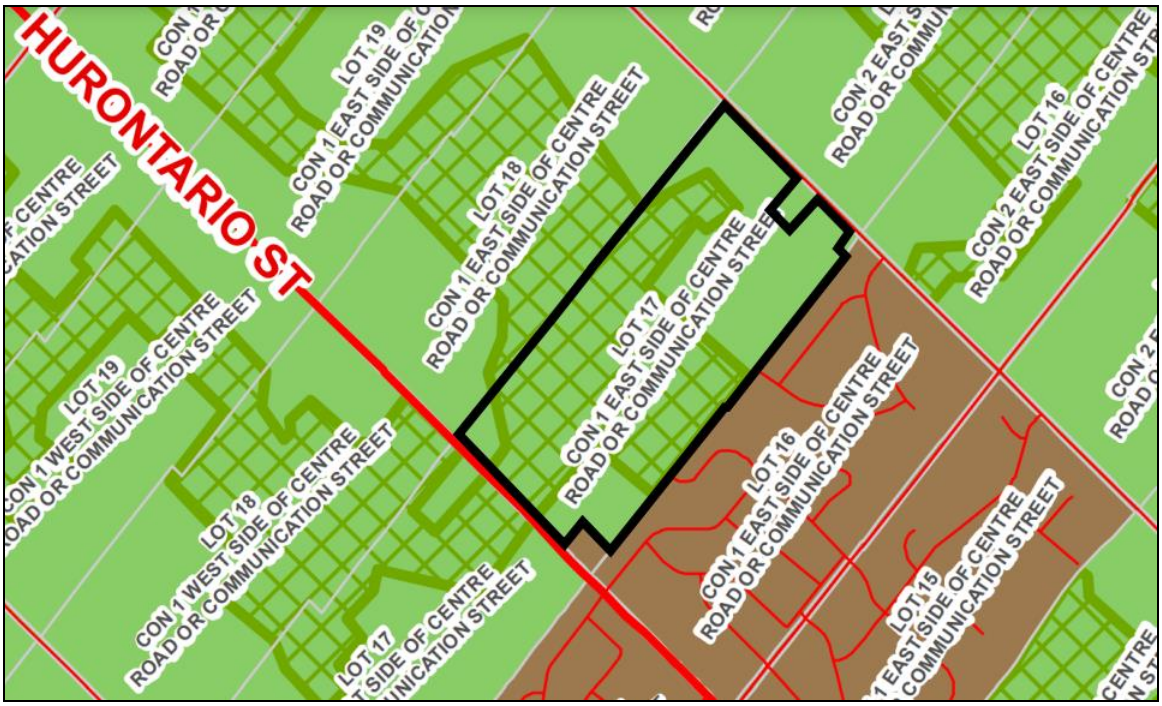


FIGURE 3 – GREENBELT PLAN MAPPING

The Greenbelt Plan provides policies which apply to lands within the rural area. Rural Areas of the Greenbelt are intended to support and provide the primary locations for a range of recreational, tourism, institutional and resourced-based commercial and industrial uses. Section 3.1.4.1 of the Greenbelt Plan states that "*Rural areas support, and provide the primary locations for a range of recreational, tourism, institutional and resource-based commercial/industrial uses*". The proposed development would contain an institutional component which is recognized as permitted within the rural area of the Plan.

Section 3.2 of the Greenbelt Plan provides policies related to the Natural System. These policies are intended to protect areas of natural heritage, hydrological and/or landform features. The Greenbelt Plan outlines policies required to manage these systems as a connected and

integrated natural heritage system. The proposed development has been designed to protect and enhance significant natural heritage systems and functions in the long-term. All development will be located away from theses features, and their associated buffers, and will be conveyed to the appropriate public authority for their long-term protection.

While removal of the subject lands from the Greenbelt Plan Boundary is required, it is appropriate in this circumstance as the subject lands are not identified as forming part of the prime agricultural land base or specialty crop area. This parcel, located on the immediate edge of Caledon Village, represents contiguous expansion of an existing settlement area, and offers a site large enough to accommodate the type of comprehensive development envisioned by this proposal while providing additional opportunities for connections to the existing community.

4.3 Places to Grow – Growth Plan for the Greater Golden Horseshoe (the "Growth Plan")

Consistent with the Provincial Policy Statement and the Greenbelt Plan, the 2020 Growth Plan contains principles (Section 1.2.1) which are intended to guide the development of land, the management of resources and the investment of public funds. Of particular importance is "*the achievement of complete communities that are designed to support healthy and active living and meet peoples needs for daily living throughout an entire lifetime*", and, *support for "a range and mix of housing options, including additional residential units and affordable housing, to serve all sizes, incomes, and ages of households*".

The proposed development will service the rural area of the Town of Caledon, through the provision of a broad range of housing types and unit sizes including institutionalized seniors care and the associated employment opportunities. It is anticipated that the majority of potential residents are already located within the Town but are not currently being adequately serviced. The proposed development site is large enough to provide the opportunity to develop a project which is of sufficient size to permit residents to remain within the development as their care needs change.

The proposed development addresses the policies of the Growth Plan, providing supportive care for residents of the local area while providing a mix of employment opportunities to the area to meet long term needs. The proposed density of the development will aid in meeting provincial targets for growth management. The provision of services to the development may be achieved through the utilization of either private or public services.

4.4 Oak Ridges Moraine Conservation Plan

The subject lands are not located on the Oak Ridges Moraine. As a result, the policies of the Oak Ridges Moraine Conservation Plan do not apply.

4.5 Local Policies

4.5.1 Peel Region Official Plan

The Region of Peel recently completed its MCR process the province approved its new Official Plan in November of 2022.

The Peel Region Official Plan designates the lands "Core Area of the Greenlands System" and "Rural System".

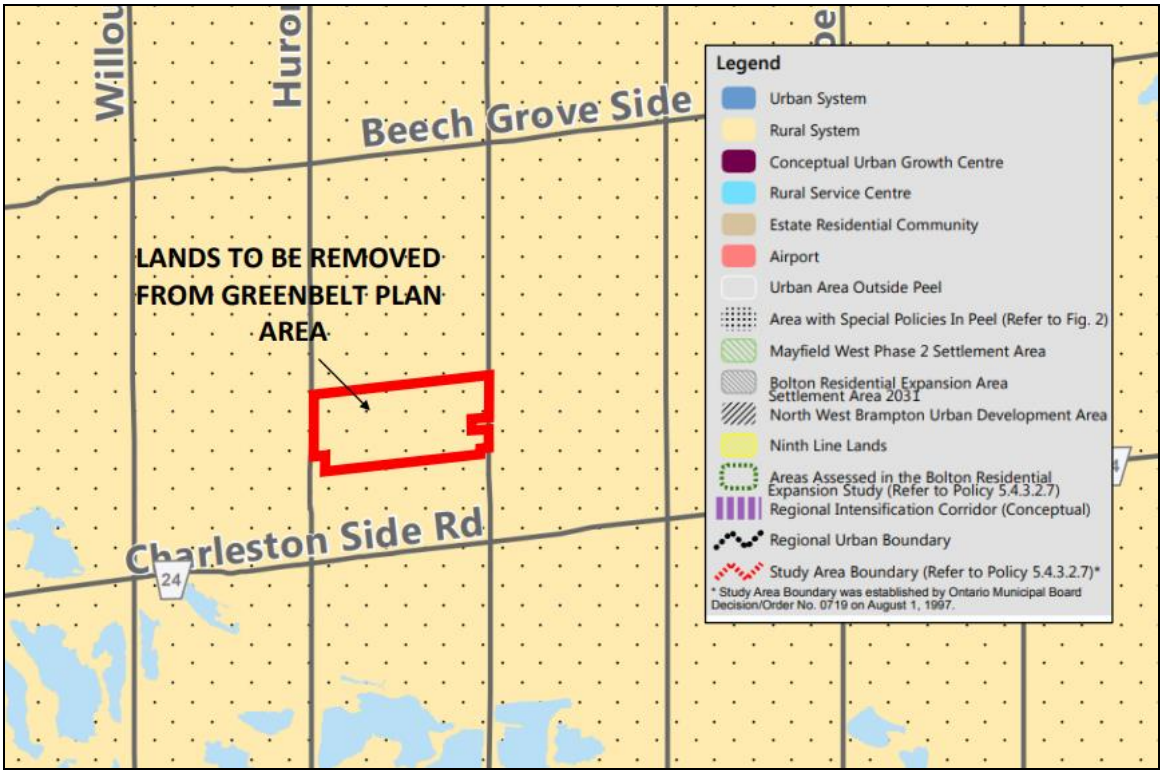


FIGURE 4 – REGION OF PEEL OFFICIAL PLAN – SCHEDULE 'D' REGIONAL STRUCTURE

The Region of Peel Official Plan contains policies with regard to the Greenlands System in Peel. Core Areas are protected by the Plan and contain ecological features, forms and/or functions which provide favourable conditions for uninterrupted natural systems and maximum biodiversity The Plan prohibits development and site alterations within the Core Areas of the Greenlands System in Peel with the exception of very limited development, servicing and recreational works. The final submission of applications to amend the Town of Caledon Official Plan and Zoning By-law to facilitate the proposed development will include a natural heritage evaluation and/or hydrological evaluation to identify the boundaries of the Natural Heritage System and any appropriate vegetation protection zone as contemplated by the Regional Official Plan and provincial policy documents.

Section 6.4 of the Region of Peel Official Plan addresses matters of Age Friendly Planning and indicates that the Regions demographic profile will change substantially in the coming years with the senior's population, defined as those 65 and older, doubling in size between 2021 and

2051 and that it is important for the region and local municipalities to plan and prepare and adopt programs and services to meet the needs of the growing and changing seniors' population. The plan clearly recognizes that the increase in seniors' population will impact the planning and delivery of services including affordable housing. The Regional of Peel supports planning of age-friendly communities and will work with local municipalities to achieve this outcome which is to include access to a range and mix of housing options and densities, including affordable housing. The vision is to plan for more age-friendly communities where seniors have access to supports that enable them to age safely and with dignity, while maximizing their quality of life.

The proposed project will assist the Region of Peel and the Town of Caledon in implementing the goals and objectives of the Region of Peel Official Plan through the protection of the Greenland system; the provision of opportunities for passive recreation; the creation of varied employment opportunities; and the creation of accommodation specifically intended to address an identified need for the aging population and affordable housing in the Town. The facility will enable aging residents to remain within their community regardless of changes to their needs for care or their requirements for assistance with the tasks of daily living.

4.5.2 Town of Caledon Official Plan, OPA 179, 206 and 207

The Town of Caledon Official Plan designates the lands as "Agricultural Area" and "Environmental Policy Area".

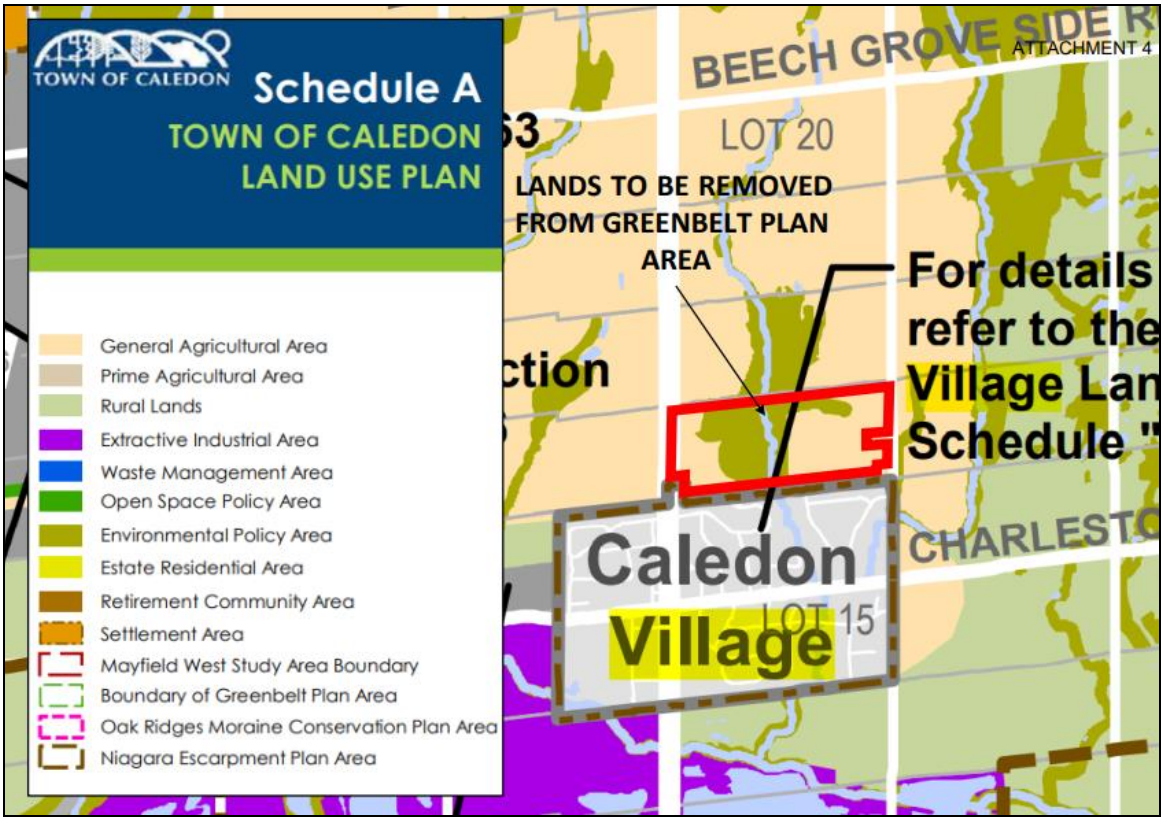


FIGURE 5 – TOWN OF CALEDON OFFICIAL PLAN – SCHEDULE 'A' LAND USE

Institutional uses are not permitted in either of these designations. OPA 179, which came into effect March 25, 2009, designates portions of the lands "General Agricultural Area". OPA 206 redesignated portions of the subject lands from the EPA designation to the "Rural" and "Agricultural" designations. OPA 207 redesignated portions of the subject lands from the Agricultural Area designation to the Environmental Policy Area.

Section 3.5 of the Town of Caledon Official Plan outlines policies related to the provision of housing. Section 3.4.1 of the Plan recognizes that there is a need to create opportunities for a diverse range and mix of housing types, densities and tenure to provide for the changing demographics of the area. This section of the Official Plan recognizes the importance of Caledon as a unique and distinctive rural based community which is seeking innovative solutions to the housing needs of the community. Section 3.5.2.1 of the Plan seeks to promote and foster the development of housing for individuals and groups with special needs and accessibility challenges, among others. To this end, Section 3.5.3.5.2 states that the Town will support alternative kinds of private market, rental and assisted/special needs housing to meet the demands of changing demographics. The proposed development will offer the Town the opportunity to assist in meeting the increased need for special need and assisted living housing demand, as described in this policy.

Section 5.1 of the Town of Caledon Official Plan outlines policies related to the "Agricultural Area" designation. OPA 179, which came into effect on March 25, 2009, replaced the policies of Section 5.1. Generally, the objectives of the Agricultural Area designation are to protect and promote agricultural uses and normal farm practices as well as to ensure that all new land uses are designed in a manner that is compatible with existing surrounding agricultural uses and operations.

Section 5.6 of the Town of Caledon Official Plan contains policies and objectives related to Institutional uses. Section 5.6.1 contains objectives, including ensuring that adequate institutional facilities can be provided for all interest groups. General Policies contained in Section 5.6.2 indicate the predominant use of land designated Institutional shall be for institutional purposes, including medical offices and senior citizens homes, among others and that the amount, location and suitability of Institutional uses shall be regulated in the implementing Zoning By-law. A senior citizens home is not a defined term in the Official Plan, however, Zoning By-law No. 2006-50, as amended, defines a "Seniors Retirement Facility" as *a facility providing accommodation primarily for persons or couples where each private unit has a separate entrance from a common hall. Food and lodgings are provided, common lounges, recreation rooms and light care facilities may also be provided."* The proposed development will assist the Town in meeting the policies and objectives of this section through the provision of adequate institutional development to address gaps in demand within the Town. The component of the form and function of development contemplated by this proposal meets the requirements of these policies and ensures these types of uses and facilities are available in the long term, to support aging in place.

Section 5.7 of the Town of Caledon Official Plan outlines policies related to Environmental Policy Areas. Section 5.7.3.1.2 outlines permitted uses, including forest management and environmental management, limited extractive industrial, non-intensive recreational and essential infrastructure uses. Section 5.7.3.1.8 of the Official Plan states that the Town will strive, through the planning process, to ensure that EPA lands are retained in larger privately or

publicly owned blocks. Those portions of the subject lands which are designated as Environmental Policy Area are proposed to be utilized for passive recreational use, accessible to the public and to residents of the facility and will be zoned accordingly. As part of the proposed development, the lands will be held as a single large parcel, in private ownership and will be suitably zoned and buffered to ensure their long term protection.

OPA No. 179, which came into effect March 25, 2009, designates portions of the subject lands as forming part of the "General Agricultural Area". OPA 179 is intended to provide an updated policy framework for the Agricultural and Rural Areas in the Town of Caledon and replaces the policies of Section 5.1 of the Town of Caledon Official Plan.

Section 5.1.2.1 of OPA 179 outlines goals and policies related to the General Agricultural Areas. The goal of the General Agricultural Area designation is to protect high capability agricultural lands by encouraging the continuation of agriculture by providing additional economic opportunities through secondary uses and by limiting non-agricultural uses and non-agricultural severances. The policy states it is intended to provide more control to the Town to potentially allow certain rural economic development uses to occur, subject to submission of an Agricultural Impact Assessment. This policy provides the Town with the flexibility to examine opportunities for economic development within the rural area in an effort to ensure the continued viability of the rural economy. The proposed development will service existing rural residents and will address unmet demand for institutionalized care in this area.

OPA No. 206 would redesignate portions of the subject lands to the "Rural Area" designation. Within the Rural Area, permitted uses include agricultural, forestry, recreation and conservation uses, cemeteries, places of worship and public uses. Institutional uses are not permitted within the Rural Area.

An amendment to the Caledon Official Plan will be required to redesignate the subject lands to facilitate development of the proposed uses. The project will offer the Town the opportunity to meet demand for special needs housing, which is not currently being met by existing programs and services. The proposed development will include the provision of medical office space and institutional housing and will provide additional facilities for social and recreational and commercial uses to residents and the surrounding community. The proposed development will service existing rural residents and will address unmet demand for a range of housing in this area.

4.5.3 Town of Caledon Zoning By-law 87-250, 2006-50 and 2007-42

The Town of Caledon Zoning By-law No. 2006-50, as amended by Zoning By-law No. 2007-42 (Approved by the Ontario Municipal Board), replaces Zoning By-law No. 87-250. Schedule "A" of Zoning By-law No. 2006-50, as amended, zones the subject lands "Agricultural (A1) Zone" and "Environmental Policy Area 2 (EPA 2) Zone".

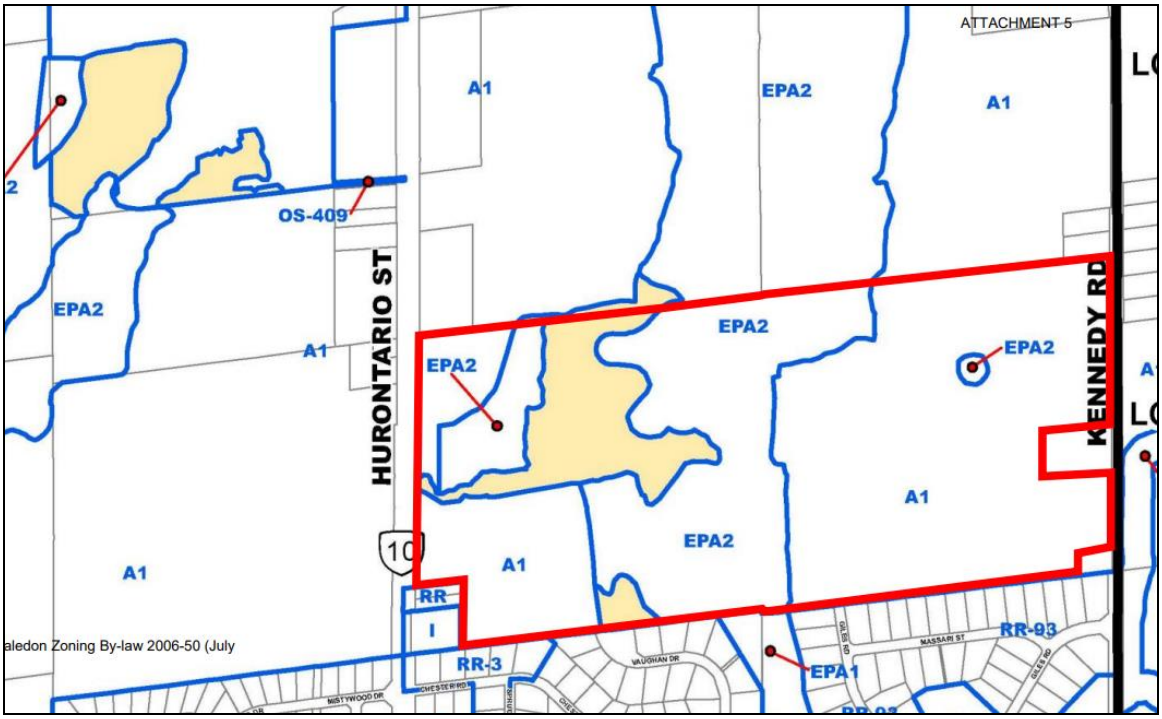


FIGURE 6 – CALEDON ZONING BY-LAW

Schedule "A" also identifies portions of the subject lands as being within the boundary of the 5-year Wellhead Protection Area.

Within the Agricultural (A1) Zone, a range of uses including detached dwelling units and accessory dwelling units, farms, home industries, horticultural nurseries and a range of storage buildings, among others, are permitted uses. The proposed use is not permitted within the Agricultural (A1) Zone.

Within the Environmental Policy Area 2 (EPA 2) Zone, permitted uses include detached dwelling units, existing farms forest management and non-intensive recreational uses, among others, are permitted. The proposed use is not permitted within the Environmental Policy Area 2 (EPA 2) Zone.

Section 4.36 of Zoning By-law No. 2006-50, as amended, contains restrictions with regard to Wellhead Protection Areas. These restrictions prohibit uses which could contaminate the Wellhead Protection Area. None of the proposed uses for this site are prohibited by the provisions of Section 4.36 of the Zoning By-law.

To facilitate the proposed development, an amendment to Zoning By-law No. 2006-50, as amended, will be required.

5.0 Supporting Documentation

5.1 Sustainable Site Servicing Assessment

A Sustainable Site Servicing Assessment was prepared by MMM Group in May of 2009 and is contained in **Appendix 2** of this Report. The Assessment focussed on the potential for sanitary servicing of the proposed development. The report included an assessment of the site's servicing potential and outlines the future steps required to implement sanitary servicing of the site.

The report addresses volume of sewage and discharge criteria; viable sanitary servicing options; the number of units that can be ultimately serviced; budgetary costs for sanitary servicing' and potential for water conservation.

The study concludes that three methods of waste treatment are available for the subject site and development concept including the transfer of untreated sewage off-site to a Region of Peel facility; discharge to surface water; and subsurface discharge. While the Study concludes that each of these proposed options is considered to be viable and each option has a variety of costs and benefits, the most sustainable option in the long-term would be through the provision of extending critical public services (i.e., water, wastewater, and wastewater management infrastructure) to facilitate the proposed development while also supporting future potential growth in the Village. Expanding into unserved rural settlements, like Caledon Village, will promote better use of land, preserve green space, and satisfy the province's "Places to Grow" requirements, with a greater emphasis on intensifying the use of populated lands.

6.0 SUMMARY AND CONCLUSION

In general, Provincial, regional, and local land use policies encourage the development of institutional uses which support the community's social, cultural, health, and recreational needs. From a policy context standpoint, the property exhibits increased potential in terms of future expansion to the Caledon Village in order to provide a complimentary mix of uses which address current gaps in housing, specifically for seniors, persons with disabilities, and smaller households. The subject property represents a unique opportunity to accommodate a scaled expansion of seniors related buildings and facilities on the site as it benefits from its immediate adjacency to the Caledon Village and is also well positioned in terms of its size and ability to accommodate a range and mix of compatible and complimentary type uses including commercial, residential, and institutional uses.

Facilities-based long-term seniors care services, nursing homes and related living facilities, by their very nature, are classified as institutional type uses which seek to serve a community's social and health needs through the provision of housing and care for aging and elderly

populations. The *Aging with Confidence: Ontario's Action Plan for Seniors* defines naturally occurring retirement communities as places where individuals either remain or move when they retire. Typically, these places are characteristic of physical and social environments that facilitate greater activity and promote feelings of well-being. Caledon is the one of the fastest growing area municipalities in Peel Region. Although the Region has experienced growth in all age cohorts, the Action Plan recognizes that older residents are increasing at a faster rate with the 60 to 64, 80 to 84 and 85 and over groups outpacing all other categories. This population growth coupled with increases in the number of older residents will require a balance of investments and strategic thinking to determine how best to serve the public at various stages in their lives and to allow people to age in place.

The subject lands represent a continuous and logical progression of the Caledon Village Community while contributing to the overall variety of seniors related dwelling types and facilities available to the current and future residents of the Town. The proposal directly assists the Town in achieving a complete community with appropriate densities and mixes of uses that reflects current policy and plans from the Province. It is also the applicants desire to develop this project with an integrated vision and strategy through the provision of critical public services to facilitate development while also supporting future potential growth in the Village Lastly, it is recognized that these types of land uses form an integral part of the community structure and can be appropriately integrated within the broader community fabric with little to no potential for conflict and/or incompatibility.

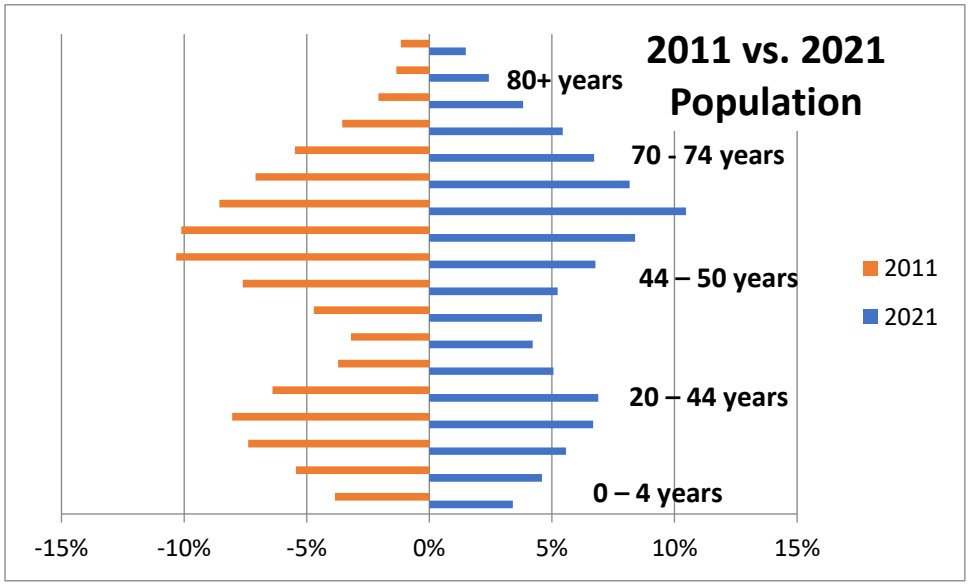
The proposed complex will also ensure the long -term protection of the natural environment and greenlands system through appropriate zoning while facilitating public access for passive and active recreational opportunities. The proposed development is consistent with the policy framework expressed in the 2020 Provincial Policy Statement ("PPS"), the Growth Plan for the Greater Golden Horseshoe ("Growth Plan"), the 2017 Greenbelt Plan, the Region of Peel Official Plan and the Town of Caledon Official Plan, all of which support the provision of a wide range of housing options to meet the social, health and well-being requirements of residents, including special needs institutional housing.

Yours truly,

HUMPHRIES PLANNING GROUP INC.

Rosemarie L. Humphries BA, MCIP, RPP
President

Caledon Village Statistics	**2011**	**2021**
DEMOGRAPHICS		
Population 2011	11,576	--
Population 2021	--	11,712
Population Growth Rate (11 to 21)	1.2%	1.2%
Median Age	45	48
% of the population aged 15 and over	83.6%	86.2%
HOUSING STOCK		
Number of census family in private households	3,425	3,525
Number of persons not in census families	375	1,175
Percentage of People not in Census Families	3.24%	10.03%
Average number of persons per census family	3.1	3.0
Average number of persons in private households	3.0	3.0
Single Detached Housing	3,645	3,765
Apartment, building more than 5 storeys	0	5
Semi-detached house	60	70
Row house	50	40
Apartment, duplex	45	45
Apartment, building less than 5 storeys	75	70



Statistics Canada. 2022. Census Profile. 2021 Census of Population. Ottawa. Released November 30, 2022.

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10-08103-001-SS1

February 25, 2009.

Ms. Rosemarie Humphries
Humphries Planning Group Inc.
216 Chrislea Road
Suite 103
Vaughan, ON L4L 8S5

Dear Ms. Humphries

Subject: **Sun Valley Developments**
Sustainable Site Servicing Assessment
Caledon Village, Ontario
FINAL DRAFT

1.0 BASIS FOR STUDY

In December 2008, the Humphries Planning Group Inc. and Nick Cortellucci authorized MMM Group Limited to prepare a Sustainable Site Servicing Assessment for Sun Valley Developments (Caledon Village, Ontario). This letter report is intended to focus on the potential for sanitary servicing of the proposed development.

The following letter report summarizes our assessment of the site's servicing potential, and outlines the future steps required to implement sanitary servicing at the site. We have approached the assessment as the first step in what will be a detailed planning study, with all planning and environmental considerations to be addressed in due course.

As outlined in the original proposal, this report will address:

- Volume of Sewage and Discharge Criteria
- Viable Sanitary Servicing Options
- The Number of Units that can be Ultimately Serviced
- Budgetary Costs for Sanitary Servicing
- Potential for Water Conservation

1.1 PROPOSED DEVELOPMENT AND SURROUNDING AREA

The proposed development will be comprised of single-tier and multi-tier senior residences including long term care, respite accommodation, and assisted living in an approximately 80ha parcel located adjacent to the northeast corner of the built up settlement of Caledon Village (Lot 17, Concession 1 EHS, Town of Caledon, Region of Peel).

The property is currently agricultural lands to the east and west with a forested lower lying wetland area located in the center. Approximately 0.35ha of the property may be subject to Natural Heritage classification with wetland areas covering approximately two-thirds of the area. The central wetland comprises about 0.13ha of the property. A north-south draining watercourse is found in the wooded wetland bisecting the property roughly through the middle. This watercourse is a tributary to Caledon Creek, which flows west into the Credit River. The proposed development concept is anticipated to occur on the existing agricultural lands with phasing from west to east (i.e. first phase will be on the west side of the property).

The built up settlement of Caledon Village to the south is presently serviced by three municipal wells and private sewage disposal (septic tanks and tile fields). The municipal water system also includes a 3.7 million litre in-ground reservoir located approximately 3 km north of the village.

1.2 DESIGN CRITERIA

1.2.01 Population Expectations

The proposed development is be comprised of single-tier and multi-tier senior residences including long term care, respite accommodation, and assisted living. The proposed number of units and population density have been estimated by the Humphries Planning Group Inc.:

Table 1: Assisted Living Housing and Population Estimates

Housing Type	Units
Semi-Detached	80
Detached	120
Townhouse	388
2-Storey Apartment	30
4-Storey Apartment	660
Nursing Home	125
Total Housing Units	1,403
Population Density (People / Unit)	1.5
Total Population	**2,105**

This population is lower than the norm. Please note that the proposed development is less dense than the Region of Peel's Standards "Density of Single Family (Greater than 10m lots)", which would apply a population density of 50 people/ha and generate a total population of approximately 4,000. The Region of Peel does not have specific criteria for assisted living/institutional developments, but considers a population equivalent of 3 persons per hospital bed. Applying 3 persons per hospital bed and assuming 1 bed per unit, this would generate a total population of approximately 4,200.

1.2.02 Sewage Flow Estimates

Sewage flows can be broken down by source and/or usage and will vary with time. Flows for the proposed development include residential and infiltration flows.

Based on Region of Peel and Ministry of the Environment (MOE) guidelines, the following design criteria are adopted:

Table 2: Design Criteria

Average Domestic Sewage Rate (L/cap/d)	302.8
Average Infiltration Allowance (L/cap/d)	90
Harmon Peaking Factor: M = 1+ (14/(4+$P^{0.5}$)); where P = population/1000	3.57
Peak Infiltration Rate (m^3/sec/ha)	0.0002

The Region of Peel and the MOE do not have specific sewage rates, peaking factors, or infiltration allowances/rates for assisted living/institutional developments. The design criteria listed above is traditionally applied across all types of development (residential, assisted living/institutional, commercial, industrial, etc.). The peak infiltration rate is based on gross area.

Expected sewage flows are summarized as follows:

Table 3: Average Day and Peak Instantaneous Sewage Flow Estimates (1403 Units)

Sewage Flow	Domestic (m^3/day)	Infiltration/Inflow (m^3/day)	Total (m^3/day)
Average	637	189	827
Peak Instantaneous	2,275	1,384	3,652

1.2.03 Sewage Strength

Raw sewage characteristics can vary with time of day, the season, local conditions and a myriad of other factors. Consequently, often peak parameter loadings do not correspond with peak flow rates.

Expected typical raw sewage characteristics for the development are summarized in Table 4. The concentrations are based on published per capita loading rates.

Table 4: Unit Loading Parameters and Sewage Strength Estimates (1403 Units)

Parameter	Per Capita Load[1] (g/capita*day)	Concentration (mg/L)	Mass Loading (kg/day)
Biochemical Oxygen Demand (BOD_5)	85	216	179
Total Suspended Solids (TSS)	95	242	200
Total Kjeldahl Nitrogen (TKN)	5.5	34	28
Total Phosphorus (TP)	3.28	8	7

[1]Metcalf & Eddy, 4th Edition (2003)

1.2.04 Required Effluent Criteria

All sewage treatment facilities are designed to meet a certain effluent criteria. The effluent criteria typically vary depending on the ultimate fate of the effluent. Proposed disposal methods at the development include: off-site transfer of raw sewage, surface discharge of treated effluent to either the Credit River or Caledon Creek, or on-site subsurface discharge of treated effluent. These disposal options

are described in Section 3 "Alternatives and Evaluation". A discussion of the process required to establish effluent criteria and our assumptions are presented below.

1.2.04.1 Surface Discharge Effluent Criteria

The process required to establish surface water effluent criteria is described by MOE Standard "Water Management" (1994):

1. Site-specific receiving water assessments are to be conducted to determine the effluent requirements based on the waste assimilative capacity of the Credit River and/or Caledon Creek.

2. Site-specific effluent requirements will be compared to federal/provincial regulations/guidelines for effluent discharges and the most stringent requirement will be applied.

The MOE also dictates a minimum of secondary treatment, but again, advises that treatment beyond secondary may be necessary due to findings from the receiving water assessment. Past receiving water assessments along the Credit River have led to higher levels of treatment due to nutrient loading concerns, specifically Total Nitrate and Total Phosphorus.

Given the preliminary nature of this site servicing overview, the required receiving water assessment is not carried out at this time. Thus, the preliminary effluent criteria assumed for the development is based on the Ontario effluent guidelines provided in "Water Management, Appendix A, Provincial Water Quality Objectives" (PWQO), the federal effluent guidelines provided in "Canadian Water Quality Guidelines for the Protection of Aquatic Life" (CWQG), and input from the Credit Valley Conservation (CVC). In general, the CVC will not commit to specific surface discharge effluent concentrations and points to provincial and federal guidelines as their standards. Expected effluent limits for Total Phosphorus (TP), Nitrates (NO_3), 5-Day Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS), and Ammonia (NH_3) are presented below.

<u>Total Phosphorus</u>

The PWQO for phosphorus is 0.03 mg/L. This target is achievable for Policy 1 watercourses, but is challenging for Policy 2 watercourses. The Credit River has been classified as a Policy 2 watercourse. Reports and studies over the years have advised stringent limits on the Credit River due to poor water quality and consistently high levels of TP. In a Policy 2 watercourse:

"Water quality which presently does not meet the (PWQO) shall not be further degraded and all practical measures shall be undertaken to upgrade the water quality to the Objective".

However there are watercourses where it may not be technically feasible, physically possible or socially desirable to achieve the PWQO. In the case where it has been clearly demonstrated that all reasonable and practical measures to attain the PWQO have been undertaken, but the PWQO is not attainable because of natural background water quality, then a deviation from Policy 2 for a specific parameter(s) may be allowed, subject to MOE approval.

Thus, a deviation from Policy 2 for phosphorus may be achievable based on Credit River phosphorus levels subject to findings in a site-specific receiving water assessment to be carried out in Phase II.

A report published by CVC, "Caledon Creek and Credit River Subwatershed Study" (December 2001), suggests an environmental target for TP of <0.10 mg/L.

Nitrates

There is currently no PWQO set for nitrates in surface waters. The CVC, however, has specific requirements for nitrates in surface water that follow the CWQG:

- 13 mg NO_3^-/L, or 2.93 mg NO_3^--N/L

This recent guideline (2003) is a response to a Ministry of Natural Resources (MNR) concern that "sub-lethal effects for amphibians were demonstrated for nitrate levels as low as 2.5 mg/l and fish eggs and fry were found to have been similarly sensitive to this level of nitrate". The CWQG of 2.93 mg/L is intended to protect aquatic biota in freshwater systems.

In the Credit River, nitrate levels are on average below 2.5 mg/L, but there are a number of locations with nitrate values above 2.5 mg/L. As a Policy 2 watercourse, it is suggested that a nitrate target of 5 mg NO_3^--N/L be considered for effluent discharge to surface water. This, as for the other parameters, would have to be confirmed as part of the site-specific receiving water assessment to be carried out in Phase II.

5-Day Biochemical Oxygen Demand, Total Suspended Solids, and Ammonia

Given the constraints derived relating to phosphorus and nitrate, tertiary treatment will be required. Per MOE Procedure F-5-1, the effluent targets for BOD_5 and TSS will be:

- BOD_5: 10 mg/L
- TSS: 5 mg/L

Ammonia will target the effluent limit in the PWQO of 0.02 mg/L un-ionized ammonia. Assuming an average temperature of 9°C at pH 8.0, the percentage of NH_3 in solution is 1.7%. To produce 0.02 mg/L un-ionized ammonia, the total ammonia can equal 1.18 mg/L.

Expected surface discharge effluent criteria for the full development (1403 units) are summarized in Table 5:

Table 5: Summary of Surface Discharge Effluent Limits

Parameter	Effluent Limit (mg/L)
BOD_5	10
TSS	5
NH_3 (as N)	1.2
NO_3^- (as N)	5.0
TP	0.1

Please note that the above proposed preliminary surface discharge effluent limits are based on effluent guidelines provided in the PWQO, the CWQG, and input from the CVC. These limits will have to be confirmed as part of the site-specific receiving water assessment to be carried out in Phase II.

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1.2.04.2 Subsurface Discharge Effluent Criteria

For subsurface disposal, nitrogen levels dictate treatment requirements. The MOE's Reasonable Use Guidelines will apply to the site. Reasonable use, in simple terms, requires that the "waste disposal" activities of a landowner do not impair upon the reasonable use of a water resource by others. For sewage disposal with respect to groundwater, the reasonable use analysis typically examines the concentration of nitrate (a health related parameter). The calculation must demonstrate that the nitrate concentration will be 2.5 mg/L or less at the downgradient property boundary. Ultimately, the expected nitrate effluent limit depends on background nitrogen, sewage flow, property size and location of the disposal beds with respect to groundwater flow.

The presence of a low-lying wetland and a north-south draining watercourse bisecting the property adds a complication to the reasonable use assessment. If it is felt that the wetland and watercourse can be affected by the subsurface disposal plume, then additional surface discharge criteria for phosphorous and ammonia may apply. The MOE Sewage Works Guidelines (December 2008) may offer an alternative interpretation, stating that if the edges of all disposal beds are located 300m or more from the receiving surface water body, the MOE may assume that the phosphorous and ammonia are fully attenuated. However, the MOE states in the Guidelines (December 2008) "in certain situations such as where there are particularly sensitive receivers or where different surface water quality standards may apply, an assessment would be required". If any of the regulatory agencies believe the wetland to be "particularly sensitive", then phosphorus and ammonia criteria may be applied.

The Reasonable Use Calculations (attached as Appendix A) consider two scenarios. The first scenario uses contamination attenuation zone (CAZ) areas based on the assumption that the effluent plume makes it way to the central watercourse wetland feature. The second scenario assumes that the plume travels below the central watercourse and results in a larger CAZ. The fate of the effluent plume can only be determined though detailed fieldwork which would be undertaken in Phase II.

The size of the CAZ determines the potential number of units that can be serviced by a subsurface disposal system. Reasonable Use Calculations for Scenario 1 suggests that up to 1100 Units could potentially be serviced. Servicing of the proposed 1403 units could be feasible if Scenario 2 can be proven. Without supporting field data, Scenario 2 is currently considered highly optimistic. The MNR echoes this concern (referenced in Appendix B). Therefore we are anticipating that subsurface disposal options can only support an 1100 unit development.

The revised sewage flows and strength based on 1100 units are as flows:

Table 6: Average Day and Peak Instantaneous Sewage Flow Estimates (1100 Units)

Sewage Flow	Domestic (m^3/day)	Infiltration/Inflow (m^3/day)	Total (m^3/day)
Average	500	149	648
Peak Instantaneous	1,823	1,384	3,207

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Table 7: Unit Loading Parameters and Sewage Strength Estimates (1100 Units)

Parameter	Per Capita Load[1] (g/capita*day)	Concentration (mg/L)	Mass Loading (kg/day)
Biochemical Oxygen Demand (BOD_5)	85	216	140
Total Suspended Solids (TSS)	95	242	157
Total Kjeldahl Nitrogen (TKN)	5.5	34	22
Total Phosphorus (TP)	3.28	8	5

[1]Metcalf & Eddy, 4th Edition (2003)

The MOE has a minimum requirement of secondary treated effluent for large systems discharging to subsurface; i.e. 25 mg BOD_5/L and 25 mg TSS/L. Given the potential sensitivity of this site, more stringent BOD_5 and TSS effluent limit targets of 15 mg/L and 15 mg/L are considered.

Expected subsurface discharge effluent criteria for the development are summarized in Table 8:

Table 8: Summary of Subsurface Discharge Effluent Limits

Parameter	Effluent Limit (mg/L)	
	Disposal area is set back >300m from the central watercourse, and surface water criteria do not apply	Central watercourse is deemed to be "particularly sensitive" and surface water criteria do apply
BOD_5	15	15
TSS	15	15
NH_3	n/a	1.2
NO_3^--N	3.0	3.0
TP	n/a	0.1

2.0 POTENTIAL CONSTRAINTS ON SERVICING

In addition to the effluent limits outlined in Section 1, there will be a number of physical and regulatory constraints given the location of the development. These will have planning implications and will affect future study and implementation phases.

Regulatory constraints that have implications as planning proceeds include the location of the development within:

- Greenbelt Area Protected Countryside and partially within a Natural Heritage Area; contains Key Natural Heritage features and Key Hydrologic features;
- Credit Valley Conservation's Regulated Area. Thus, the property is subject to Ontario Regulation 160/06, which prohibits altering a watercourse, wetland, or shoreline, and prohibits development (e.g. new structures, additions, site grading) in areas adjacent to the Lake Ontario shoreline, river and stream valleys, hazardous lands (floodplain, erosion), and wetlands without the prior written approval of CVC;
- Core Greenlands and Environmental Policy Area by the Region of Peel and the Town of Caledon;
- Caledon Creek Subwatershed (#16) and the Regional Storm Flood Plain.

Regulatory studies that would be required as part of future servicing studies include:

- A water efficiency study;
- A receiving water assessment to determine the waste assimilative capacity of the Credit River and/or the Caledon Creek;
- Groundwater studies;
- A boreholes and soils investigation, and;
- An environmental implementation report (EIR) relating to the subwatershed.

Physical constraints that will affect future study and implementation phases:

- A wetland that has been identified by the CVC as the Caledon Village Wetland;
- A Significant Woodland as defined by the Region of Peel;
- May contain or provide habitat for Redside Dace, a provincially threatened species;
- A relatively tight soil strata which would affect any subsurface disposal options; and,
- A potential for bedrock to be located close to ground surface. This must be taken into consideration in design and implementation of servicing disposal system since bedrock located at shallow depth can pose difficulties for servicing.

The impact of these constraints could include: reduced area and number of units available for development, and servicing costs.

Please refer to the email appended as Appendix C, from the CVC dated February 9th, 2009.

3.0 ALTERNATIVES AND EVALUATION

This section describes the alternatives considered to treat and dispose of the domestic wastewater from the proposed development. Three alternatives are considered:

- Transfer Untreated Sewage Off-Site to a Region of Peel Facility
- Discharge to a Surface Water
- Subsurface Discharge

The evaluation of options in this preliminary assessment consider: acceptance by approval authorities, capital and operation/maintenance costs, and experience with similar systems elsewhere. As the development planning proceeds, a number of additional factors that will be considered are: site specific environmental conditions, flexibility with respect to phasing, compatibility with development plans, and flexibility/simplicity/certainty of operation.

3.1 ALTERNATIVES FOR SEWAGE DISPOSAL

3.1.1 Transfer Off-Site

The Region of Peel has advised that there is no sanitary service available for the area, and there is presently no plan to service the area. The closest sanitary trunk available is in Caledon East along Airport Road, which given the distance (approximately 18km), would be very costly to run a forcemain through. The installation of a forcemain through open Green Belt Designated Land is currently not permitted (Reference: the Plan, Chapter 4.2 – Infrastructure).

Future treatment plants in Inglewood, Alton, and Cheltenham are also not currently considered due to suspected capacity issues and due to their distance from Caledon Village.

3.1.2 Surface Water Discharge

The development, as currently proposed, can be serviced by an on-site treatment plant with the effluent discharged to a local watercourse. A Credit River discharge has not been discounted by CVC, but the relatively low river flow (7Q20 flow rate = 0.34 m^3/s) dictates that stringent discharge criteria would be required. Caledon Creek, which is closer to the development, may be a suitable receiver of the effluent; however, some CVC reports have indicated that the Creek is considered intermittent, and thus cannot support a continuous effluent discharge. It is anticipated that if surface water discharge is pursued, then the Credit River would be the receiver. As discussed above, the ultimate approval of a river discharge would be contingent on a favourable site-specific receiving water assessment.
Infrastructure required for sewage servicing with disposal to the Credit River would include:

- On-site collection and transfer;
- Sewage treatment with an advanced system (membrane bioreactor followed by ultraviolet disinfection considered in this assessment although a number of technologies are available);
- Effluent equalization and pumping station feeding a 5.4km forcemain to the Credit River; and
- Underwater river outfall with effluent dispersion and mixing zone.

3.1.3 Subsurface Discharge

The nature of sewage servicing with subsurface discharge will depend on groundwater flows patterns and the potential impact of the central watercourse wetland feature. Initial Reasonable Use calculations suggest that the development of 1100 units may be possible. The level of treatment will be dictated largely on whether the central watercourse is deemed to be "particularly sensitive" and surface water criteria are applied.

The infrastructure anticipated for the surface discharge options include:

- On-site collection and transfer;
- Conventional secondary sewage treatment followed by denitrifying filters or alternatively an advanced treatment system (such as membrane bioreactor) if surface water criteria are applied;
- Effluent pumping to a series of subsurface disposal beds located at specific areas around the development.

Please be aware that the disposal bed areas must be maintained as green spaces, which dictate to some extent the siting of facilities around the development.

3.2 ECONOMIC COMPARISON OF ALTERNATIVES

ALTERNATIVE 1 – Transfer Off-Site

The cost to transfer the raw sewage to existing Region of Peel services is based on a pumping station feeding an 18km forcemain from the development to an existing sanitary trunk along Airport Road near Caledon East. Region of Peel fees to accept the raw sewage have been determined assuming metered service recorded in metric units (sanitary sewer charges are $\$0.50/m^3$). Charges for capital costs related to any required upgrades to the Region's system are to be evaluated and are not included below.

The capital costs are estimated to be about $7,200 per unit (assuming 1403 units). Annual operation and maintenance costs for the system operating at full capacity are estimated at approximately $130 per unit per year. The cost of treatment and effluent disposal to the Credit River is summarized as follows:

Table 9: Summary of Transfer Offsite Cost Estimate (1403 Units)

Item	Total	Total
Raw Sewage Pumping Station and Forcemain		$6,900,000
Capital Upgrades to Region's Facilities		TBD
OH & P (15%)		$1,000,000
Contingency (15%)		$1,000,000
Engineering (15%)		$1,000,000
Total Estimated Capital Cost		$10,100,000+
Annual Estimated Operation and Maintenance Costs	$190,000	
Net Present Value of Annual Operation and Maintenance (3%, 20 years)		$2,800,000
TRANSFER OFF-SITE NET PRESENT VALUE		**$12,800,000+**

ALTERNATIVE 2 – Surface Water Discharge

The cost for surface water discharge includes a sewage treatment facility incorporating advanced biological treatment, UV disinfection, effluent equalization, and a pumping station feeding a 5.4km forcemain to a controlled outfall in the Credit River. Operating costs assume the cost of chemicals, labour, maintenance and power requirements for a year.

The capital costs are estimated to be about $6,600 per unit (assuming 1403 units). Annual operation and maintenance costs for the system operating at full capacity are estimated at approximately $130 per unit per year. The cost of treatment and effluent disposal to the Credit River is summarized as follows:

Table 10: Summary of Surface Discharge Cost Estimate (1403 Units)

Item	Total	Total
Surface Discharge Wastewater Treatment Plant		$4,100,000
Sewage Pumping Station and Forcemain		$2,300,000
OH & P (15%)		$1,000,000
Contingency (15%)		$1,000,000
Engineering (15%)		$1,000,000
Total Estimated Capital Cost		$9,300,000
Annual Estimated Operation and Maintenance Costs	$190,000	
Net Present Value of Annual Operation and Maintenance (3%, 20 years)		$2,800,000
SURFACE DISCHARGE NET PRESENT VALUE		**$12,100,000**

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ALTERNATIVE 3A – Subsurface Discharge (Applying Surface Water Criteria)

Assuming the application of surface water criteria, the cost for subsurface water discharge includes advanced biological treatment, effluent equalization, and distribution of effluent to a series of subsurface disposal beds located at three different locations on the property. Operating costs assume the cost of chemicals, labour, maintenance and power requirements for a year.

The capital costs are estimated to be about $9,200 per unit (assuming 1100 units). Annual operation and maintenance costs for the system operating at full capacity are estimated at approximately $180 per unit per year. The cost of treatment and subsurface effluent disposal with surface water criteria applied is summarized as follows:

Table 11: Summary of Subsurface Discharge (Applying Surface Water Criteria)
Cost Estimate (1100 Units)

Item	Total	Total
Surface Discharge Wastewater Treatment Plant		$4,000,000
Sewage Pumping Station, Forcemain, and Filter Beds		$2,900,000
OH & P (15%)		$1,000,000
Contingency (15%)		$1,000,000
Engineering (15%)		$1,000,000
Total Estimated Capital Cost		$10,100,000
Annual Estimated Operation and Maintenance Costs	$200,000	
Net Present Value of Annual Operation and Maintenance (3%, 20 years)		$2,900,000
SUBSURFACE DISCHARGE (APPLYING SURFACE WATER CRITERIA) NET PRESENT VALUE		**$13,000,000**

ALTERNATIVE 3B – Subsurface Discharge (Avoiding Surface Water Criteria)

Assuming that surface water criteria is avoided, the cost for subsurface water discharge includes conventional biological treatment with denitrification, effluent equalization, and distribution of effluent to a series of subsurface disposal beds located at three different locations on the property. Operating costs assume the cost of chemicals, labour, maintenance and power requirements for a year.

The capital costs are estimated to be about $9,700 per unit (assuming 1100 units). Annual operation and maintenance costs for the system operating at full capacity are estimated at approximately $160 per unit per year. The cost of treatment and subsurface effluent disposal with surface water criteria applied is summarized as follows:

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Table 12: Summary of Subsurface Discharge Cost Estimate

Item	Total	Total
Surface Discharge Wastewater Treatment Plant		$4,400,000
Sewage Pumping Station, Forcemain, and Filter Beds		$2,900,000
OH & P (15%)		$1,100,000
Contingency (15%)		$1,100,000
Engineering (15%)		$1,100,000
Total Estimated Capital Cost		$10,800,000
Annual Estimated Operation and Maintenance Costs	$180,000	
Net Present Value of Annual Operation and Maintenance (3%, 20 years)		$2,600,000
SUBSURFACE DISCHARGE (AVOIDING SURFACE WATER CRITERIA) NET PRESENT VALUE		**$13,300,000**

SUMMARY OF ALTERNATIVES

The cost estimates to transfer off-site, discharge to surface water, and subsurface are presented below:

Table 13: Summary of Cost Estimates

	Transfer Off-Site	Surface Water Discharge	Subsurface Discharge (Applying Surface Water Criteria	Subsurface Discharge (Avoiding Surface Water Criteria)
Total Estimated Capital Cost	$10,100,000+	$9,300,000	$10,100,000	$10,800,000
Net Present Value of Annual Operation and Maintenance (3%, 20 years)	$2,800,000	$2,800,000	$2,900,000	$2,600,000
Net Present Value	**$12,800,000+**	**$12,100,000**	**$13,000,000**	**$13,300,000**

The subsurface discharge options generate higher costs due to increased capital costs relating to the distribution of effluent and the subsurface disposal beds. The slight difference between applying and avoiding surface water criteria is due to lower capital costs relating tertiary treatment and lower operation/maintenance costs relating to chemical use.

With a total cost estimate on the scale of $12.1 million, surface water discharge is approximately $700,000 less than transferring raw sewage off-site to existing Region of Peel facilities. This difference is due to the capital costs associated with constructing a forcemain of this size to transfer off-site. Moreover, the capital cost relating to upgrades to existing Region of Peel facilities is unknown, which could result in the cost of transferring off-site being quite similar to the cost of subsurface discharge.

In addition, please be reminded that collection system costs, which are similar for all treatment and disposal systems reviewed herein, are not included in the comparative costs above. As well, there are other common costs that must be considered including letters of credit likely required by the municipality to allow them to continue operation of constructed treatment works in the event of owner default.

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3.3 WATER CONSERVATION AND REUSE

3.3.1 Demand Management

Reducing water usage and wastewater generation diminishes the cost to treat and dispose of sewage. By reducing water usage, facilities can be made compact, more cost efficient, and with a smaller environmental footprint.

At this point the Region of Peel will not accept a sanitary design flow criteria less than 302.8 Lcpd, but may consider a lower value if a water efficiency study is conducted. Given the adoption of lower sanitary design flow criteria by the Region of Durham and the Region of York after studies on water, wastewater and energy, there is a potential for the Region of Peel to similarly adopt a lower design flow criteria.

The following studies also determined that over the past decade, there have been reductions in water use as a result of water efficiency programs, changes to the building code, and changes to the type of developments constructed:

- Region of Durham Efficient Community Final Report (May 2008) by Veritec Consulting Inc;
- Regional Municipality of York Unit Rates Water and Wastewater Master Plan Update (May 2008) by Genivar Ontario, Inc;

The Regions of Durham and York, which currently operate with residential demands of ~250 Lcpd to ~200 Lcpd, have postulated that the residential demand could possibly be lowered to 150 Lcpd. While 150 Lcpd may be quite aggressive, reductions of 20% (~250 Lcpd) would be reasonable, based on the above studies. The studies explored specific water efficiency programs inside the home including: efficient clothes washers (front-load), dishwashers, toilets (3L/flush), and showerheads (7.5L/min). Outside the home this may include drought-restraint landscaping and rainwater harvesting. While the studies did not investigate non-residential developments, there is potential for assisted living/institutional developments to implement/accommodate the residential water efficiency programs.

Challenges for the Region of Peel would be monitoring and enforcing compliance with the methods and techniques that have been installed to provide the water reductions.

3.3.2 Effluent Reuse

It is becoming increasingly common to reuse effluent for local irrigation. This, however, is a seasonal use and would not reduce treatment or disposal requirements.

Grey water systems where the effluent is recycled for toilet flushing can reduce infrastructure requirements and associated costs. A sign-in by the MOE and the Ministry of Health (MOH) would be required; the MOH may be reluctant to do so, given the intent of the proposed development.

4.0 CONCLUSIONS

Transfer off-site to the Region of Peel's system is the option could have the greatest uncertainty. Its cost could be significantly higher once charges for capital costs related to the Region's system are accounted for. In addition to the unknown Region's capital costs, there is concern relating to whether we will be

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allowed to build a long forcemain through the Greenbelt to reach the trunk sewer on Airport Road in Caledon East.

Surface water discharge is the least expensive of all the alternatives. Positives include: the ease of locating the sewage treatment facility on the west side of the property to fit into proposed phasing from west to east, and possible acceptance by approval authorities since a similar treatment facility owned by the Region of Peel in the Village of Inglewood (Caledon) presently discharges to the Credit River.

While the subsurface discharge alternatives are potentially the most expensive, they avoid environmental concerns relating to building in the Greenbelt. However, the site's central watercourse wetland could significantly limit the number of units that could be developed. Given that the disposal beds must be 300m away from the watercourse, they may need to be located where the conceptual plan presently indicates other facilities.

At this preliminary stage of the project, options should not be ruled out. It does appear that treatment and discharge to surface water is the more viable approach. The impact of the Greenbelt is a definite concern, but this method of disposal maximizes the number of units, minimizes costs, and there is a precedence for the approval agencies involved.

As the planning process proceeds on the Sun Valley Developments initiative, the next steps for the servicing component include:

- Confirmation of the number and type of units to be serviced;
- Justification of anticipated sewage generation from each;
- Review of water efficiency options available;
- A receiving water assessment to determine the waste assimilative capacity of the Credit River and/or the Caledon Creek;
- Groundwater and soils investigation, and;
- An environmental assessment of servicing options, in conjunction with other site issues.

We trust that our assessment of the sewage servicing potential of the site and future steps considered to implement servicing at the site meet your objectives. Should you have any questions, please contact me at (905) 882 – 4211 ext. 6401.

Yours very truly

MMM GROUP LIMITED

Pete Sladen, P.Eng.
Senior Project Manager
Environmental Engineering

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Encl.

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INTER-OFFICE MEMO

To:	Pete Sladen	Date:	January 12, 2009
From:	Andrew Kulin	Job No.:	10-08103-001-SS1
Subject:	Hydrogeology/Reasonable Use	CC:	Sarah Duff

A preliminary Reasonable Use Analysis has been carried out to support an on-site sewage disposal feasibility study on behalf of Mr. Nick Cortelucci. This preliminary analysis is based upon information and data obtained from a desk-top study. Neither site visits nor any field work was carried out in support of this work but will be required to support the submissions made to the Ministry of Environment and other review agencies. These preliminary results and conclusions may therefore change following collection and analysis of site specific data at some later date, should the client wish to proceed further.

Mr. Cortelucci owns an 80.80 hectare parcel of land located adjacent to the northeast corner of the built up settlement of the Caledon Village (Lot 17, Concession 1 EHS, Town of Caledon, Region of Peel). The property is currently comprised of agricultural lands within the eastern and western portions with forested lower lying wetland area located in the central part of the property. A north-south draining watercourse is found in this wooded/wetland area bisecting the property roughly through the middle. This watercourse is a tributary to Caledon Creek, which is located south of Caledon Village and in turn flows to the west into the Credit River.

Our understanding is the Caledon Village is presently serviced with municipally supplied water with private sewage disposal. Two municipal wells are located south of the community on the west side of Highway 10 approximately half way between Charleston Sideroad and Escarpment Sideroad (formerly 10th Sideroad). A third municipal well site is located at Beachgrove Sideroad (formerly 20th Sideroad) near to Porterfield Road (formerly 2nd Concession West). A 3.7 million litre in-ground reservoir is located at Highway 10 and Beachgrove Sideroad north of the village.

The property is located within the Greenbelt Area Protected Countryside. Greenbelt Plan mapping indicates that the central wooded area, and extending west to Highway 10 and to what appears to be a small pond near the top of the easternmost ridge (on-site) falls within a zone mapped as Natural Heritage Area. This wetland area is identified elsewhere as the Caledon Village Wetland, and there is conflicting information identifying it as either locally significant, or as a Provincially Significant Wetland. The property is not located within the Niagara Escarpment Plan Area (located on the order of 3 km to the south of the property), nor within the Oak Ridges Moraine Plan Area.

It is proposed to develop these lands with a retirement community comprised of both assisted living facilities and single, semi-detached and townhome lots currently totalling 1,403 units. The proposed development will occur on the eastern and western portions of the property, with the central wooded and wet area to remain largely as-is, with the exception of a proposed collector road traversing this area to link the east and west sides of development and some tree cutting at the northwest.

The property is located within a Physiographic Region identified by Chapman and Putnam (1984) as the Guelph Drumlin Field which is comprised of sandy to sandy silt till derived from the underlying Amabel Dolostone. Southeast to northwest trending drumlins are mapped on the property and to the north of the property. The ground elevation of the property ranges

from a topographic high of approximately 445 masl along northeast property line to a low estimated at 432 masl where the central watercourse exits the property at the south. Groundwater flow in the vicinity of the site is mapped in a southerly direction, with regional groundwater contours at the property illustrated at 440 to 430 masl (CVCA).

The mapped surficial soils at the site are identified as sandy silt tills according to Ontario Geological Survey mapping. South of the village, the Caledon Meltwater Channel is found, comprised of sand and gravel deposits. The sand and gravel pits found to the south of the village are located within these meltwater channel deposits.

The site is underlain by the Amabel Dolostone, and the Amabel Aquifer is an important regional aquifer with good yield and good water quality. Based on review of older well records that MMM has on file for the area, the bedrock surface is interpreted to slopes from the north-northwest to the south-southeast, at elevations on the order of 430 to 420 masl (interpreted) under the site. **There is therefore the potential for the bedrock to be located close to ground surface in areas of the site and this must be taken into consideration in design of a sewage disposal system should bedrock be found at shallow depth at proposed sewage effluent disposal locations.**

The site is located within the Credit River Watershed and is therefore located within the Credit Valley Conservation Authority's (CVCA) jurisdictional area. The CVCA had commissioned a number of watershed studies, some of which are available on their web-site and these reports were located and reviewed, consisting of:

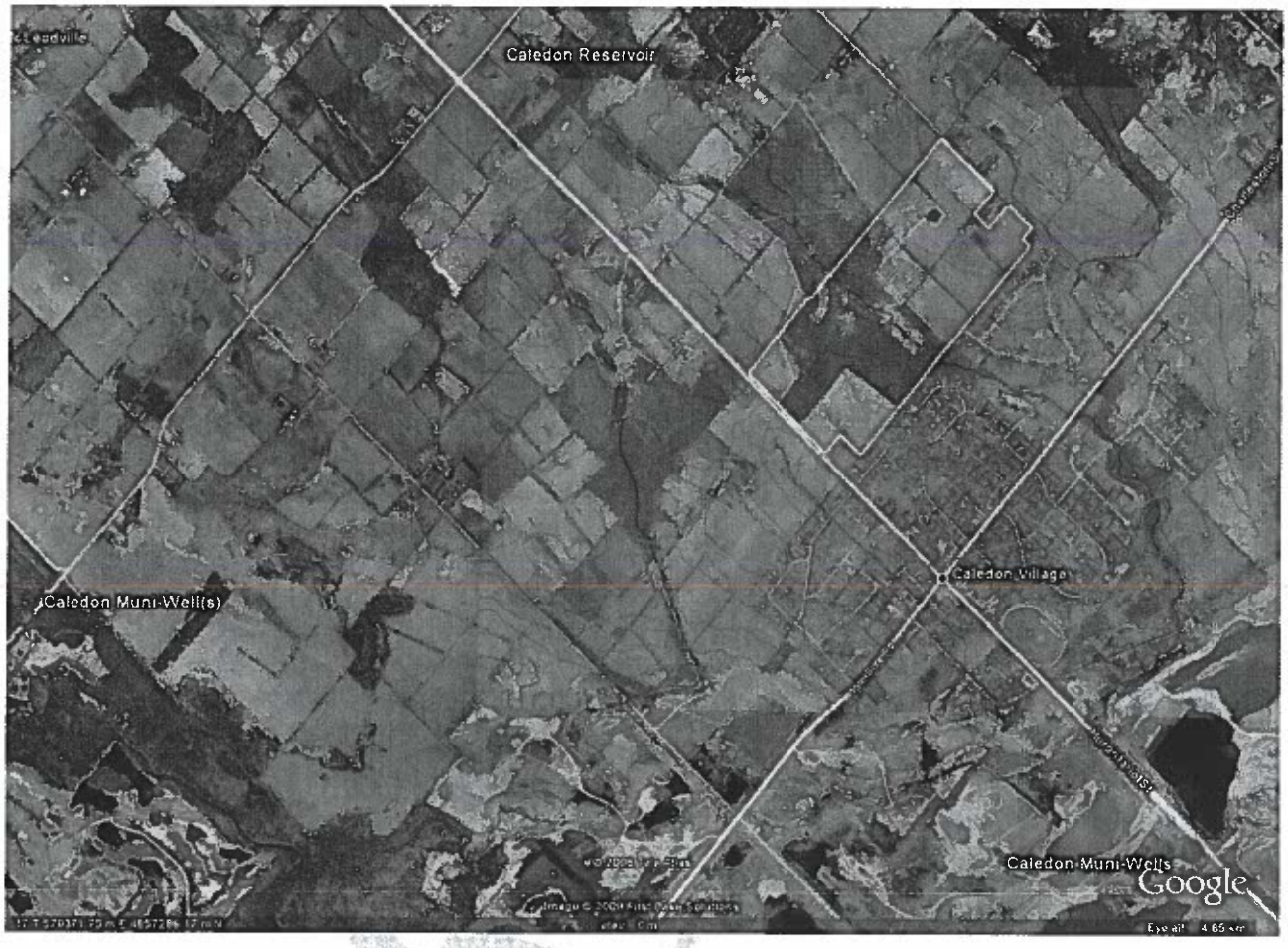
- July 1997 - Caledon Creek and Credit River Subwatershed Study – Background Report
- Nov. 1998 – Subwatershed Characterization Study (Caledon Creek)
- March 2000 – Subwatershed Impact Assessment (Caledon Creek)
- Dec. 2001 – Subwatershed Implementation Report (Caledon Creek)

Based upon the review of the reports from the CVCA web-site, the property is located within three subwatersheds to Caledon Creek identified as 1614 (west-southwest part of property alongside Highway 10), 1611 (main, central watercourse feature), and 1610 (east side of property). The property is located in an area classified in the CVCA reporting as having low to moderate recharge potential.

The CVCA Reports states that Caledon Creek, which flows south of the village is intermittent, because it drains into the underlying sands and gravels associated with the Caledon Meltwater Channel. In general, the tributaries flowing from the till plain to the north (such as found at the site) disappear once they reach the meltwater channel. Furthermore, the reports suggest that flows from these tributaries are intermittent, unless they drain a wetland.

Examination of aerial images of the site obtained using Google Earth, combined with the regionally interpreted static water levels contained in the CVCA reporting along with topographic information suggests that the central wetland area found on the property may receive groundwater inputs for much of the year, and thus may not be classifiable as ephemeral (or intermittent). **This has implications for the Reasonable Use Analyses discussed later.**

Figure 1:



Notes:

1. Yellow Line = approx. site boundary
2. Green line = Natural Heritage Features limit (approx.) as defined by the Green Belt Plan (it is truncated on this drawing as it extends much further north)
3. Wetland boundaries are shown as red cross-hatching (difficult to see at this scale)
4. Topographic Contours also presented with red lines (245 masl high ground on ridges along north property line, low point < 235 masl at creek outlet at south central property boundary.
5. Surficial Geology is shown as shaded areas (green tint = till, orange tint = sands/gravels)
6. Blue lines are interpreted regional groundwater contours. 440 masl, 430 masl and 420 masl from north to south.
7. Caledon Municipal Well fields and reservoir location are also shown on this figure.
8. North is up.

Reasonable Use Analysis

A preliminary Reasonable Use analysis was carried out using the information identified from the background review of published data. These analyses will need to be revised once site specific data has been obtained and preliminary designs, e.g., locating and sizing of disposal facilities, calculations of flows and so forth becomes available.

For large scale sewage disposal facilities the calculations specified within Chapter 22 of the MOE Design Guidelines for Sewage Works (December 2008) were followed.

Reasonable Use is an MOE Policy that in simple terms requires that the "waste disposal" activities of a landowner does not impair upon the reasonable use of a water resource by others. For sewage disposal with respect to groundwater, the Reasonable Use analysis typically examines the concentration of nitrate which is a health related parameter. The calculation must demonstrate that the nitrate concentration will be 2.5 mg/L or less at the downgradient property boundary. The MOE Design Guidelines specify that the parameter concentrations within the sewage effluent may be diluted by applying a 250 mm/year infiltration rate across the area of the tile field plus the area located downgradient of the tile field to the property boundary (referred to as the Contaminant Attenuation Zone (CAZ)). **Therefore siting of the tile fields at an early stage in the design process is considered desirable to permit maximizing of the CAZs.**

For surface water applications, the MOE Design Guidelines indicates that Phosphorous and Un-ionized Ammonia calculations be carried out unless the distance from the edges of the tile bed areas is located 300 m or more from a receiving surface water body. In that situation, the MOE assumes that the Phosphorous and Un-Ionized Ammonia are fully attenuated or converted to nitrogen and Reasonable Use calculations for these "surface water" parameters would generally be un-necessary (there is however wording in the guidelines document that provides an "out" to this). The limits on surface water for Phosphorous, using Provincial Water Quality Objectives is very low, and extremely high phosphorous removal within the treated sewage, and/or very large CAZs would be required to meet Reasonable Use at receiving water bodies. Keeping the sewage tile fields beyond 300 m of identified water bodies would be a preferred alternative as it would remove these stringent requirements to be calculated and included with the submissions to the MOE.

For the purpose of this preliminary analysis, it was assumed that the three mapped watercourses passing through the centre of the site and to the east and west of the property are not intermittent and therefore subject to Reasonable Use calculations for surface water impacts. If later on-site work indicates these watercourses are intermittent or not receiving groundwater inputs from the site then the areas on-site with potential for receiving sewage effluent may be expanded. Additionally, this analysis has assumed that the wetland areas are not receiving shallow groundwater otherwise the 300 m buffer distance would be applied from the edge of the wetland.

Figure 2:

Notes:

1. See Notes from Figure 1 apply to this figure except where otherwise stated. Feature limits and other lines represented on the figures are approximated (not geo-referenced) and will be subject to revision.
2. Orange lines approximate the watershed divides.
3. Shallow groundwater flow is assumed to closely follow existing topography.
4. Potential Tile Field areas are shown with purple shading. The limits are defined by a 300 m buffer from the centreline of the three watercourse channels, which are assumed to be receiving groundwater inputs. This 300 m buffer (or setback) may remove Phosphorus and Un-Ionized Ammonia from the Reasonable Use assessment.
5. CAZs are shown in lighter blue shading and are based upon the assumption that shallow groundwater flow mimics the topography.
6. Total area of potential tile field locations and CAZs as shown:
    a. 38.5 ha +/- (48.0% of total site area) – based on potential shallow groundwater flow only, discharging to central waterourse
    b. 55.6 ha +/- (69.4% of total site area) – less conservative, presumes additional CAZ is available from central area, with infiltrating groundwater passing under the central watrecourse
7. North is approximately in the direction of the upper-right corner.

It was assumed for these preliminary calculations that the three watercourses may receive shallow groundwater from the site and a 300 m buffer was applied around the centre lines of each of these channels to identify areas where tile beds could be located. These are shown in Figure 2.

There is also what appears to be a small "wetland" in a depression near the northern part of the easternmost ridge. For this analysis we have assumed that this is an area that is supplied with surface water runoff and not shallow groundwater, otherwise the potential tile field area may have to be reduced further south, which will also reduce the total CAZ available from this area.

CAZs are identified on Figure 2 and are based upon assumed shallow water table flow (which follows the site topography) and the regional groundwater flow presented within the CVCA reports. Two possible total CAZ area scenarios were identified (tile field areas are the same in both scenarios):

- Scenario 1: CAZs are based on the anticipated shallow groundwater flow only. The center-most CAZ, approximately trapezoidal shaped, shown in the middle of the forested wetland is based of regional flow in the underlying aquifer, and is excluded from the calculation. Total estimated area is about 38.5 ha or 48.0 % of the total site;

- Scenario 2: The central CAZ shown on Figure 2 (based on regional groundwater flow presented in the CVCA report) can also be included in the calculations. This would in essence be justifiable if the central stream and wooded wetland is found not to be receiving groundwater discharge. It is considered an optimistic scenario, with total estimated coverage of 55.6 ha (69.4% of site area).

As obvious from Figure 2, the areas with potential for tile field locations are oddly shaped and located within large tracts of land currently proposed for housing units. It is likely that the maximum extent of these areas and resultant CAZs cannot be 100% utilized for treated sewage application (tile fields) based on both development planning considerations and technical considerations (location of treatment plant, appropriate configuration of beds, etc.). To account for this in the analysis, it was therefore assumed that 50% of the combined area available for tile beds and resultant CAZs would apply to the Reasonable Use Calculations.

For the calculations, the following additional sewage inputs were used:

- Daily Sewage Flows (based on 1,403 units): 826,844 L/day;
- Total Nitrogen in effluent after tertiary treatment: 3.0 mg/L;
- Total Phosphorous in effluent after tertiary treatment: 0.1 mg/L.

Table 1 presents the results of the analysis for nitrate. The detailed Calculations are presented in the attached Table A-1. Table A-1 presents the calculations under the assumed case that 50% of the total available CAZ and tile bed areas may be used. These detailed tables also presents the reasonable use calculations for phosphorous and un-ionized ammonia for comparison (target concentrations are based upon Provincial Water Quality Objectives). The results for the latter two parameters clearly indicate that these if required to be met at the site will pose greater constraint to development than nitrate.

Table 1: Calculated Results for Nitrate under Reasonable Use (Preliminary)

	50% of Potential Bed Areas + CAZs are available for dilution
CAZs defined by Shallow Groundwater Contours Only	
Dilution Area/ Dilution Volume	**19.2 ha / 48,081 m^3/yr**
Calculated Boundary Concentration (2.5 mg/L required)	2.59 mg/L
Daily Sewage Flow to meet 2.5 mg/L at boundary with 3.0 mg/L effluent concentration	650,000 LPD → 2.5 mg/L
Effluent Concentration to meet 2.5 mg/L at boundary with daily sewage flow of 826,844 LPD	2.90 mg/L $_{effluent}$ → 2.5 mg/L
CAZs defined by Shallow and Regional Groundwater Contours (OPTIMISTIC)	
Dilution Area/ Dilution Volume	**27.8 ha / 69,469 m^3/yr**
Calculated Boundary Concentration (2.5 mg/L required)	2.44 mg/L
Daily Sewage Flow to meet 2.5 mg/L at boundary with 3.0 mg/L effluent concentration	**925,000 LPD → 2.5mg/L**
Effluent Concentration to meet 2.5 mg/L at boundary with daily sewage flow of 826,844 LPD	3.07 mg/L $_{effluent}$ → 2.5 mg/L

The preliminary results presented in Table 1 are based upon the assumptions stated throughout this document, and are expected to be revised once factual, on-site data is obtained through further investigation. Using the assumptions described in this document, the estimated concentration of nitrate (2.59 mg/L) within the groundwater at the property boundaries under the proposed population flows and treatment conditions will exceed the required reasonable use concentration of 2.5 mg/L. Reducing daily flows by about 22% to 650,000 LPD, or increasing the treatment effectiveness for total nitrogen to 2.9 mg/L would result in the calculated 2.5 mg/L at the property boundaries. The other set of results presented above for nitrate are based on more optimistic calculations and should not be relied upon for decisions regarding viability of this project.

Furthermore, should surface water requirements be required to be met, either through the requirements of MOE, CVCA or other review agencies, then the calculations presented in Table A-1 indicate that significant reduction in daily sewage flows (approximately 93%) or a 66% further reduction in Phosphorous removal and a further reduction of 54% of total nitrogen removal in the effluent would be required for the current development proposal.

Table A-1: Reasonable Use Calculations - Caledon Development - Nitrate/Nitrite/Ammonia (as N) and Phosphorous - Desktop Analysis for Feasibility

(Based on Methodology Outlined in Sewage Design Manual - Dec. 2001 Assumes 50% Potential Tile Field and CAZ available (19.2ha - 24.0% of site (Scenario 1), or 27.8 ha - 34.7% of site (Scenario 2))

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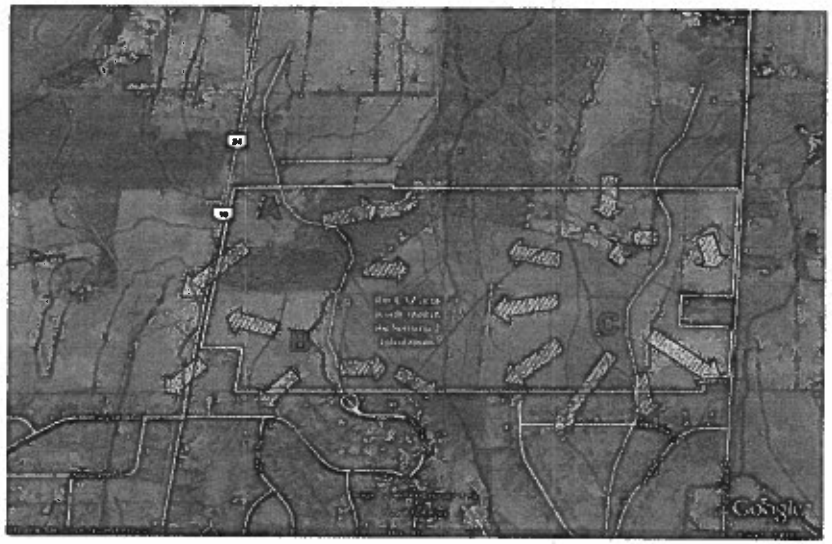
Area Calculations - Assumes 3 areas of site suitable for effluent disposal	
Total Property Area	800,800 m^2
Dilution per year	0.25 m/yr
Area Scenario 1	
Area of CAZ on Site - Scenario 1	192,325 m^2
Volume of Dilution On-Site - Absolute Best Case Scenario	48,081 m^3/yr
Area Scenario 2	
Area of CAZ on Site - Scenario 2	277,875 m^2
Volume of Dilution On-Site - Absolute Best Case Scenario	69,469 m^3/yr
Reasonable Use Inputs	
Reasonable Use Concentration - Nitrate + Nitrite + Ammonia	2.5 mg/L
Reasonable Use Concentration - Phosphorous (based on PWQO for streams)	0.03 mg/L
Reasonable Use Concentration - Un-Ionized Ammonia (assumed)	0.02 mg/L
- assume 9C average T, or pH 8.0 - so un-ionized = 1.7% of Total Ammonia	1.18 mg/L
- therefore, Total Ammonia can equal 1.18 mg/L to arrive at 0.02 mg/L un-ionized ammonia	

Note: 1 mg/L = 1 g/m^3

Engineer's Calculated Average Flows (plus infiltration leakage) =	826,844 L/day

Assumptions:

- 3 areas shown are based on being 300 m from watercourse (or within 300 m but on other side of a surface water/water table (v. shallow groundwater) divide - assumes for now that there is GW discharge to these watercourses
- the 300 m limitations applied above (to watercourses) then assumed to remove phosphorous from RU analysis.
- assumes that the placement of the effluent disposal beds in the above three areas is laid out to fully maximize the area and downgradient CAZ
- CAZ area based on assuming that shallow Water table flow direction plus regional groundwater flow components apply.



Groundwater Flow Arrows are presumed shallow/surficial flows (THC)

50%

Zone	m^2
Field A	53,650
CAZ_A	21,800
Field B	54,400
CAZ_B	36,900
Field C	66,600
$CAZ_{C\ East}$	65,800
$CAZ_{C\ West\ (east)}$	126,300
$CAZ_{C\ West\ (west)}$	71,100

Total Dilution Area Scenario - 1 192,325 24.0%

Fields A-B-C plus all CAZ except area furthest west of Field C

Total Dilution Area Scenario - 2 277,875 34.7%

Fields A-B-C plus all CAZ plus area furthest west of Field C

Calculation A: Estimated Flows using Tertiary Treatment - Area Scenario 1

Area = 19.23 ha

Groundwater Parameters	Effluent Concentrations
Combined Ammonia + Nitrate (as N)	3.0 mg/L
Surface Water Parameters	
Total Phosphorous	0.1 mg/L
Total Ammonia (as N)	3.0 mg/L
Daily Allowable Sewage Flows	826,844 L/day

Combined Ammonia + Nitrate (as N)

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 2.5 mg/L	2.59 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 3 mg/L) needed to meet boundary concentration of 2.5 mg/L	650,000 L/day	2.494
Sewage concentration (@ 826844 L/day) to meet boundary concentration of 2.5 mg/L	2.90 mg/L	2.501

Phosphorous

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 0.03 mg/L	0.09 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 0.1 mg/L) needed to meet boundary concentration of 0.03 mg/L	55,000 L/day	0.0295
Sewage concentration (@ 826844 L/day) to meet boundary concentration of 0.03 mg/L	0.034 mg/L	0.0293

Total Ammonia (to calculate un-ionized ammonia)

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 1.18 mg/L	2.59 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 3 mg/L) needed to meet boundary concentration of 1.18 mg/L	85,000 L/day	1.177
Sewage concentration (@ 826844 L/day) to meet boundary concentration of 1.18 mg/L	1.37 mg/L	1.182

Calculation B: Estimated Flows using Tertiary Treatment - Area Scenario 2

Area = 27.79 ha = larger area assuming that groundwater flow passes under central creek

Groundwater Parameters	Effluent Concentrations
Combined Ammonia + Nitrate (as N)	3.0 mg/L
Surface Water Parameters	
Total Phosphorous	0.1 mg/L
Total Ammonia (as N)	3.0 mg/L
Daily Allowable Sewage Flows	826,844 L/day

Combined Ammonia + Nitrate (as N)

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 2.5 mg/L	2.44 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 3 mg/L) needed to meet boundary concentration of 2.5 mg/L	925,000 L/day	2.488
Sewage concentration (@ 826844 L/day) to meet boundary concentration of 2.5 mg/L	3.07 mg/L	2.496

Phosphorous

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 0.03 mg/L	0.05 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 0.1 mg/L) needed to meet boundary concentration of 0.03 mg/L	90,000 L/day	0.0296
Sewage concentration (@ 826844 L/day) to meet boundary concentration of 0.03 mg/L	0.037 mg/L	0.0301

Total Ammonia (to calculate un-ionized ammonia)

Daily Flow	826,844 L/day	
Target Concentration at Boundary = 1.18 mg/L	2.44 mg/L	Calculated Boundary Concentrations - mg/L (below)
Daily sewage flow (@ 3 mg/L) needed to meet boundary concentration of 1.18 mg/L	85,000 L/day	0.926
Sewage concentration (@ L/day) to meet boundary concentration of 1.18 mg/L	1.72 mg/L	1.398

APPENDIX B: EMAIL FROM MNR

From: Heaton, Mark (MNR) [mailto:mark.heaton@ontario.ca]
Sent: Friday, February 20, 2009 2:40 PM
To: Andrew Kulin
Cc: Followes, Emma (MNR)
Subject: RE: Caledon Village Wetland

Hello Andrew,

Attached is a map showing the natural features and Greenbelt designation.

The wetland evaluation does include a groundwater score but no other detail.

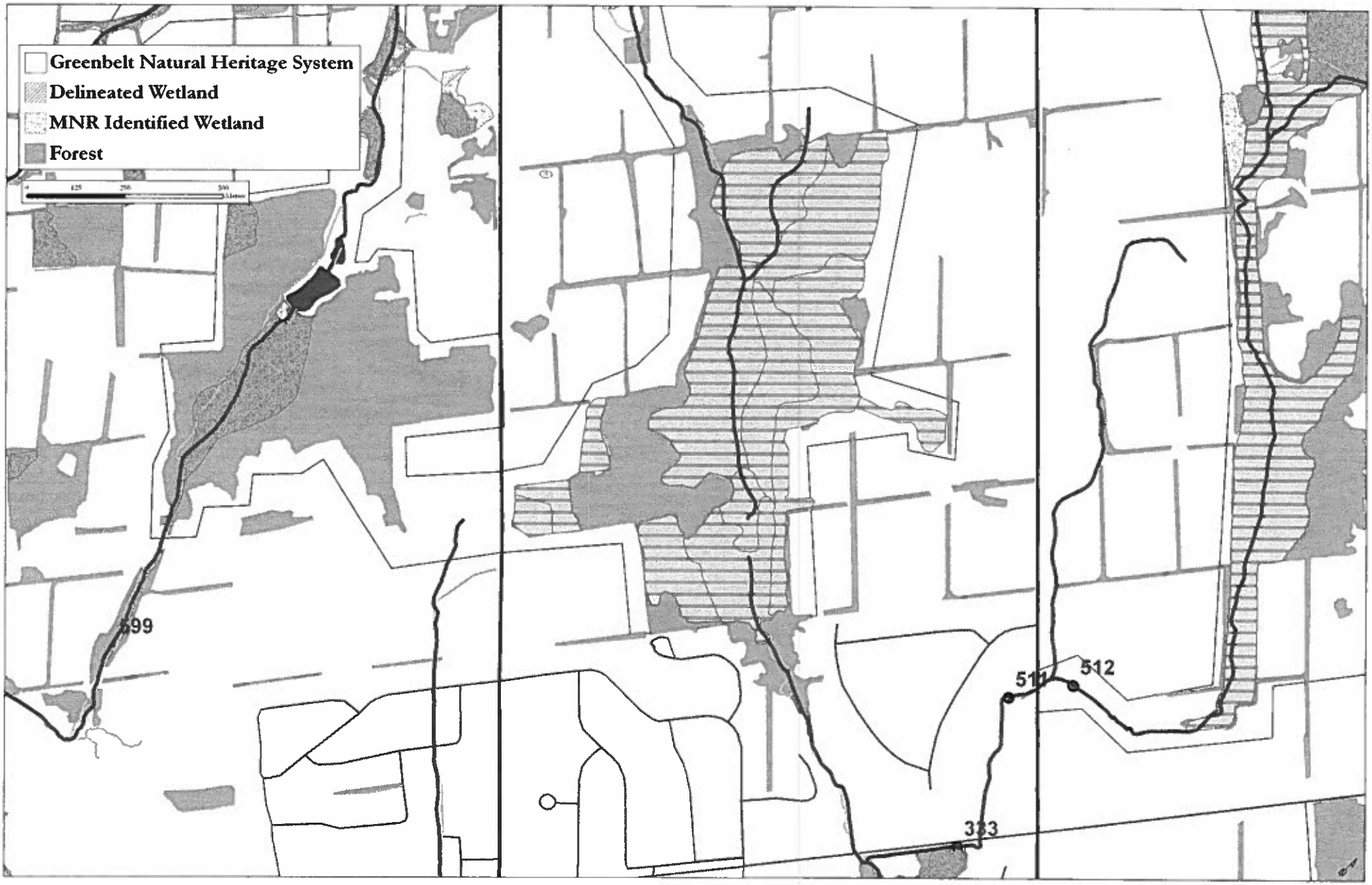
Based on a previous visit and local knowledge of the tributary, I would say that it is fed by groundwater but the flow is dominated by surface contributions.

The provincially significant redside dace, a small minnow, is known to live in the Caledon Creek basin close to Charleston Road.

Regards,

Mark Heaton

Mark Heaton
Fish and Wildlife Biologist
OMNR - Aurora
(905) 713-7406


Greenbelt Natural Heritage System
Delineated Wetland
MNR Identified Wetland
Forest
599
512
383

APPENDIX C: EMAIL FROM CVC

From: Clark, Richard [mailto:RClark@creditvalleycons.com]
Sent: Monday, February 09, 2009 12:06 PM
To: Rick Bino; Sarah Duff
Cc: Dougherty, Jennifer; Labbe, Adele; Self, Kennedy; 'Sylvia Smith'; Campbell, Joshua
Subject: Re. Caledon Village Questions for Region, MNR & CVCA - CVC General Comments Re. Proposed Development at Lot 17, Concession 1 EHS, Town of Caledon

Good Afternoon Rick and Sarah,

Staff of Credit Valley Conservation (CVC) has had an opportunity to review information in this office related to the subject property and we provide the following comments in response to your request for information:

Description of Proposal:
The preliminary proposal is for a multi-unit/facility seniors residence development on an approximately 80ha parcel of land located adjacent to the northeast corner of the built up settlement of Caledon Village (see attached Proposed Location Plan).

Ontario Regulation 160/06:
The subject property is located within a portion of this Authority's Regulated Area. As such, the property is subject to CVC Regulation of Development Interference with Wetlands, and Alterations to Shorelines and Watercourses (Ontario Regulation No. 160/06). This regulation prohibits altering a watercourse, wetland, or shoreline, and prohibits development (e.g. new structures. additions, site grading) in areas adjacent to the Lake Ontario shoreline, river and stream valleys, hazardous lands (floodplain, erosion), and wetlands without the prior written approval of CVC (i.e. the issuance of a permit).

Caledon Creek and Credit River Subwatershed Study (Subwatersheds 16 & 18) (2003):
Additionally, CVC staff note that the subject property is located entirely with the Caledon Creek Subwatershed (Subwatershed 16). This area was studied in the past in relation to the Caledon Creek and Credit River Subwatershed Study. A copy of the Study can be downloaded from the CVC website here: http://www.creditvalleyca.ca/bulletin/downloads/16_18Ph3.pdf

It should be noted that the submission of an Environmental Implementation Report (EIR) is a requirement within the relevant Subwatershed Study for the area. The purpose of the EIR is to ensure the goals and objectives set for Subwatersheds 16 and 18 are met when land use change occurs, to develop an appropriate plan that will achieve the targets set for the individual environmental resources, and to streamline the review and approval processes by providing sufficient detail at the initial stages of planning. The Terms of Reference for an EIR can be found in Appendix O of the Study.

Site Characteristics:
The subject property contains the following site characteristics:

- ***Watercourse:*** The subject property is traversed by a tributary of Caledon Creek. Any alteration to a watercourse (i.e: culverts, bridges, ponds etc.) requires a permit issued by CVC. Our concerns for new construction would include maintaining setbacks to address channel bank erosion, sediment control during construction, and to ensure no degradation to water quality. There is no information available in this office at this time to respond to your specific question regarding the tributary flowing through the middle portion of property (i.e. Question 2 for CVC on attached Issues and Questions). It is

anticipated, however, that specific answers to these questions would be obtained through the completion of a satisfactory EIR.

- ***Floodplain:*** The subject property is located partially within the Regional Storm Flood Plain. A permit may be required from CVC for any construction activity in this area. Our primary concern is the protection of life and property from the flood hazard. We have specific criteria and requirements for construction in the flood plain.

- ***Drainage Feature:*** In addition to the watercourse noted above, the property contains a drainage feature that provides a connection between the Caledon Village Wetland located in the middle portion of the property and a wetland pocket located to the east. CVC has concerns with development activities that could potentially impact and/or eliminate headwater drainage features. In order to address these concerns, CVC, in cooperation with the Toronto Region Conservation Authority (TRCA) prepared an interim guidelines document for the *Evaluation, Classification and Management of Headwater Drainage Features (2007).* These Interim Guidelines are intended to be used by both developers and their consultants and CVC staff in the preparation and review of development studies and/or applications, respectively. Among other things, these guidelines provide a comparative evaluation tool to review the integrative nature of the attributes and functions of headwater drainage features. In accordance, with these guidelines, CVC staff will request that an evaluation, classification and management of each drainage feature be provided that addresses the protection and conservation of fish habitat (e.g. permanent, seasonal, refuge, benthic invertebrates, sediment and nutrient regulation, etc.) and mitigation of hydrologic functions (e.g. flow conveyance, attenuation and infiltration/storage), as appropriate. Additionally, CVC staff will work with the Town of Caledon and Region of Peel to ensure that the management recommendations established through headwater drainage feature assessments are implemented as appropriate through the development design.

- ***Woodlands:*** CVC recognizes parts of a Significant Woodland on the property as defined by the Region of Peel. CVC will work with the Town of Caledon and Region of Peel to protect tableland woodlots, corridors/linkages, and other terrestrial natural features.

- ***Wetlands:*** Portions of the subject property are located within the Caledon Village Wetland. Although this wetland is not currently considered Provincially Significant, wetlands in general are diverse and productive ecosystems that are hydrologically significant to a watershed. They store water during flood events and provide low flow augmentation during dry periods. The vegetation and organic soils of wetlands aid in the filtration of nutrients and sediments that enhances water quality and assists in the maintenance of cool water temperatures. Wetlands also provide habitat for diverse and uncommon species of flora and fauna. On this basis, it is the policy of the CVC to conserve and protect the significant physical, hydrological and biological features and functions of wetlands and to recommend that no development be permitted which would adversely affect the natural features or the ecological functions of these areas. An Environmental Impact Study and Management Plan will be required for new development located adjacent to the wetlands on site.

- ***Threatened or Endangered Species:*** The subject property may contain or provide habitat for Redside Dace, a provincially threatened species. CVC and the Province of Ontario support protecting significant portions and adjacent lands to the habitat of endangered and threatened species from incompatible development. CVC could not support development that threatens such species or their habitat.

- ***Fisheries:*** The watercourse that traverses the subject property from north to south is a cold-water stream. Due to the nature of the watercourse and its potential importance to

fish habitat, CVC will require setbacks from the watercourse for new construction or lot grading.

- ***Municipal Greenlands:*** The subject property is partially within an area designated as Core Greenlands and Environmental Policy Area by the Region of Peel and the Town of Caledon, respectively. It is the policy of the Region of Peel and the Town of Caledon to protect the form and function of these natural areas. CVC provides technical support to these agencies with respect to delineation of natural features and reviewing potential impacts from subsequent development within and adjacent to these lands. We suggest you contact the Town of Caledon and Region of Peel if you have questions on this matter.

- ***Provincial Greenbelt:*** In addition, the property falls entirely within lands designated as Protected Countryside Area in the Province of Ontario Greenbelt Plan and partially within the Natural Heritage System. The property contains Key Natural Heritage features and Key Hydrologic features, defined in section 3.2.4 of the Greenbelt Plan, and may include, but not necessarily be limited to, wetlands, permanent and intermittent streams, seepage areas and springs, fish habitat, and significant woodlands. We suggest that you contact the Town of Caledon to discuss the relevant policies of the greenbelt plan with respect to these specific features and permitted uses.

It should be noted lands adjacent to the features and areas noted above perform important ecological functions that are critical to maintaining the integrity of natural heritage systems. As such, the relevant natural heritage protection requirements of both municipal and regional Official Plans, and the provincial Greenbelt Plan, will apply if development is proposed on the subject property in the future. Among these requirements, the applicant should be made aware of the need for a detailed EIR, which, among other things, would be expected to determine the supportive functions performed by these adjacent lands to determine what measures may be needed to maintain and enhance them should development occur on the property.

Credit River Water Management Strategy Update (2007)
To mitigate the environmental impacts of urbanization and climate change on the watershed, the Credit River Water Management Strategy Update offers municipalities and communities an ecologically friendly approach to land use planning and development. The approach emphasizes the integration of site design tools and planning techniques that conserve and enhance natural features and hydrologic functions. The aim of sustainable management practices are to:

- Preserve open space and minimize land disturbance during construction
- Incorporate natural areas into community designs and protect their features and functions (such as woodlots, wetlands)
- Re-examine the use and layout of conventional site infrastructure. For example re-examine lot and street layout to minimize paved surfaces and implement aggressive stormwater management techniques such as perforated storm sewers, street swales, disconnect downspouts, etc. to encourage infiltration.
- Customize a sustainable management plan for each potential development area

The opportunity to incorporate sustainable management practices into the proposed development wherever feasible should be considered. CVC staff is available to discuss such practices should further information be helpful in this regard.

With respect to your specific inquiry regarding effluent discharge concentration requirements (i.e. Question 1 for CVC on attached Issues and Questions), I understand that Jennifer Dougherty, CVC Water Quality Engineer, discussed this matter with you and directed you to contact the Ontario Ministry of the Environment (MOE) for further information. Please do not hesitate to contact Jennifer Dougherty (x. 262) to discuss this matter further should you have any additional questions or concerns.

We trust these general comments are sufficient. Please note that CVC will be in a position to provide more specific comments regarding the proposed development once more information is made available by the applicant and the appropriate background studies are conducted. Should you have any additional questions or concerns, please do not hesitate to contact myself.

Sincerely,

Richard Clark
Credit Valley Conservation
Planner
1255 Old Derry Road
Mississauga, ON L5N 6R4
Tel: 905-670-1615 x.275
Fax: 905-670-2210
Toll free: 1-800-668-5557
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